Interreg - IPA CBC
Italy - Albania - Montenegro
INERRAnT

AT1.2 - DT1.2.1 Ecosystem Model Structure

Project 303 INERRAnT

CONFINDUSTRIA LECCE
Dhitech SCARL DISTRETTO TECNOLOGICO HIGH TECH
CCIT DHOMA E TREGTISE DHE INDUSTRISE TIRANE
CHAMBER OF COMMERCE & INDUSTRY TIRANA

Table of Contents

Index of Figures

Glossary

Term	Definition
AHU	Air Handling Units
ATS	Active Transfer Switch
BYOD	Bring Your Own Device
CNR	Consiglio Nazionale della Ricerca
DMZ	Demilitarized Zone
DVR	Digital Video Recorder
EP	Electric Panel
FEX	Fabric Extender
FPA	Framework Programme Agreement
Gbps	Gigabit per secondo
GPU	Graphics Processing Unit
ICT	Information Communication Technology
ISP	Internet service provider
ISUFI	Istituto Superiore Universitario di Formazione Interdisciplinare
IP	Internet Protocol
IT	Information Technology

KET	Key Enabling Technologies
kVA	kilovolt ampere
KW	Kilo Watt
LAN	Local-Area Network
MEF	Ministry of Economy and Finance
MIUR	Ministry of Education, Universities and Research
MIT	Massachusetts Institute of Technology
NAT	Network Address Translation
NNL	National Nanotechnologies Laboratory
P.A.	Public Administration
PEC	Posta Elettronica Certificata
PON	Programma Operativo Nazionale
PP	Project Partner
R&D	Research and Development
RFID	Radio Frequency IDentification
SAN	Storage Area Network
SAS	Statistical Analysis System
SDN	Software-defined networking

SLA	service-level agreement
SME	Small and Medium Enterprise
SSD	Solid State Drive
UPS	uninterruptible power source
UCS	Unified Computing System
Vlan	Virtual LAN
VM	Virtual Machine
VoIP	Voice over IP

Introduction

On the basis of the information resulting from the analysis of the state of the art in the territories involved (A.T.1.1), in this activity PPs will define the interregional Ecosystem Model. It has to be inter-linked with research and entrepreneurial actors in public-private logic, able to foster dialogue between different territories, enhance collaborative research actions, support talents mobility and strengthen the capacity of attracting private capitals. DHITECH will lead the activity, because of its experience as High Technology District, which for years has put in contact research and innovative companies, training new generations of young entrepreneurs also coming from the research world.

SECTION 1
THE DHITECH MODEL

1 "A success story": the foundation of the High Tech District DHITECH

Figure 1 DHITECH District

Between 2001 and 2005, significant public-private partnerships have been developed and consolidated in Salento, most of all around two main themes:

- Advanced materials and Nanotechnologies
- ICT - Intelligent Management

In this context, the Puglia Region, the Italian Ministry of Education, Universities and Research (MIUR) and Ministry of Economy and Finance (MEF) signed the Framework Programme Agreement (FPA), which gave life to the Apulian Technology District DHITECH, in June 2005. Then, the Apulian Technology District was established on 20 December 2005 and legally classified as a limited liability consortium company.

The original consortium was composed by the following public and private founding partners:

- Public Members
  - National Research Council
  - or University of Salento
- Private Members

- Avio SpA
- Engineering Ingegneria Informatica SpA
- FIAMM SpA
- Leuci SpA
- STMicroelectronics

The FPA recognised how consolidated in previous years as scientific and technological potential and, above all, as an experience in attracting organic relationships with companies (joint public-private laboratories).

This Agreement specified the conditions and motivations to justify its institutionalisation, i.e. attractiveness of the National Laboratory of Nanotechnologies (NNL) and the e-Business Management sector of the ISUFI Higher School of the University of Salento on national and multinational companies. The DHITECH is in fact characterized in the FPA as the most mature district reality in Puglia, regarding private-public research, training and technology transfer.

In short, the Agreement summarizes the concomitant factors that gave rise to the Dhitech:

- The University of Salento - ISUFI Higher School, as an element of international training in the High-Tech sectors;
- A cluster of national and international companies (ST Microelectronics, Alenia Aeronautica, Engineering Ingegneria Informatica, Avio) that already collaborate with public excellence
- The rapidly growing University of Salento

The FPA also establishes the overall objective of the Apulian Technological District: to develop and integrate an interdisciplinary cluster for Nanoscience, Biosciences and Info Science, according to the European Research Program and the National Research Plan.

In its first five years of activity, from 2006 to 2010, DHITECH has pursued a well-defined strategic objective, basic for the Puglia Region: contributing to the increase of the investment flow in industrial research. In fact, 2007 recorded an expenditure in research by companies, compared to GDP, equal to 1/3 of the national average, with the consequent marginality of the rate of industrial research workers. In the same year, the Puglia Region was in fact the penultimate Italian region (followed by Calabria) with respect to these indicators. Regarding the public spending on research instead, Puglia was aligned with the regional average.

This anomaly was caused by:

- "Dusting" of the business fabric and the consequent presence of socio-cultural barriers, deriving from the family structure of the enterprises and the unwillingness to set up a network among the companies
- Predominance of low-medium intensity knowledge production
- General underestimation, by companies, of the relevance of research for competitive purposes.

In that period, DHITECH has proposed itself as a catalyst of public-private partnership, elaborating and advancing industrial research projects among the large member companies of the district (located in the convergence regions) and the public excellences of the university and CNR structures located in Puglia, according to the provisions of the Framework Program Agreement signed in 2005.

2 DHITECH and the regional economic challenge to change

The territorial challenge is dealt with in different ways, depending on the contexts, according to the different profiles, the intrinsic strengths and weaknesses, and the external conditions related to opportunities and threats.

DHITECH faces the challenge of structural change in the Apulian regional economy, by focusing its strategy on building a mix of individual and collective skills among young graduates.

A mix of skills built in the Integrated System of Training - Research - Innovation that DHITECH has realised by specializing it on three Socio-Technical Systems enabling the ecosystem of Innovative High-Tech Entrepreneurship.

This choice reflects the reading of the critical issues that - more than others - authorize to talk about Puglia as a Region to be supported in its processes of structural change.

DHITECH is giving its substantial contribution to the structural change that mainly affects young people. Paradoxically, the same young people, which countries and territories build their future on, today are:

- afflicted by pathological phenomena of unemployment and underemployment;
- neglected by a fragile productive system, which if it does not employ them, and when it employs them, pays them little and with precarious characters;
- marginal, with respect to non-effective innovation processes, compressed in their potential by a context not available for the diffusion of new products and services.

DHITECH reads the challenge of structural change to be induced in the regional context, as a challenge to create and consolidate an integrated training, research and innovation environment, where the young graduates are in the same unit of space and time, supported in the learning processes, involved in research activities, actors in innovation processes.

Such an environment, ***where the values of learning, creating new knowledge, and creating economic and social value coexist***, can be defined by resorting ***to the very traditional concept of "building site"***.

The "building site" is the operating environment in which entrepreneurship deploys its creative attitudes, scientific and technological talent meets the problems and stresses of real life, and research goes in parallel with learning.

it is also the ***space in which little, medium and big problems are solved, by using instrumental resources and/or knowledge acquired or to be acquired***, already identified or to be identified, to be used as they are or to be adapted, or even to be re-invented.

This "traditional" character of the "building site" also has a deeply innovative character, reflecting the concept of the "Triple Helix" that involves Government Institutions, University/Research centres and Businesses.

In particular, the "building site", in the sense of DHITECH, is the space where, rather than buildings or roads, new products, new processes and new services based on new technologies are designed and prototyped.

2.1 Innovator/entrepreneur engineer

The intellectual capital pursued by DHITECH is able of identifying the spaces of opportunities, emerging from the integration of Research, Training and Innovation, and moving from the users' needs of innovation,

prefiguring, through the technologies, a potential for the generation of new products, services, markets and sectors, currently largely unknown.

The creation of the profiles of intellectual capital with these characteristics involves product and process innovation, concerning the mixing of skills characterizing the profile of the Innovator/Entrepreneur engineer and the processes, through which abilities and skills are created.

DHITECH enhances the industrial research projects as "building sites" for the creation of the Entrepreneur/Innovator Engineer, defined with the "T model" that integrally integrates areas of skills and transversal competencies, with the most specifically specialized skills related to the classes of technologies required by the research projects they are involved in.

The young Innovator/Entrepreneur Engineer, protagonist of the DHITECH strategy, sees the potential of technology in the resolution of economic and social problems and needs. In this figure, complex types of competence coexist.

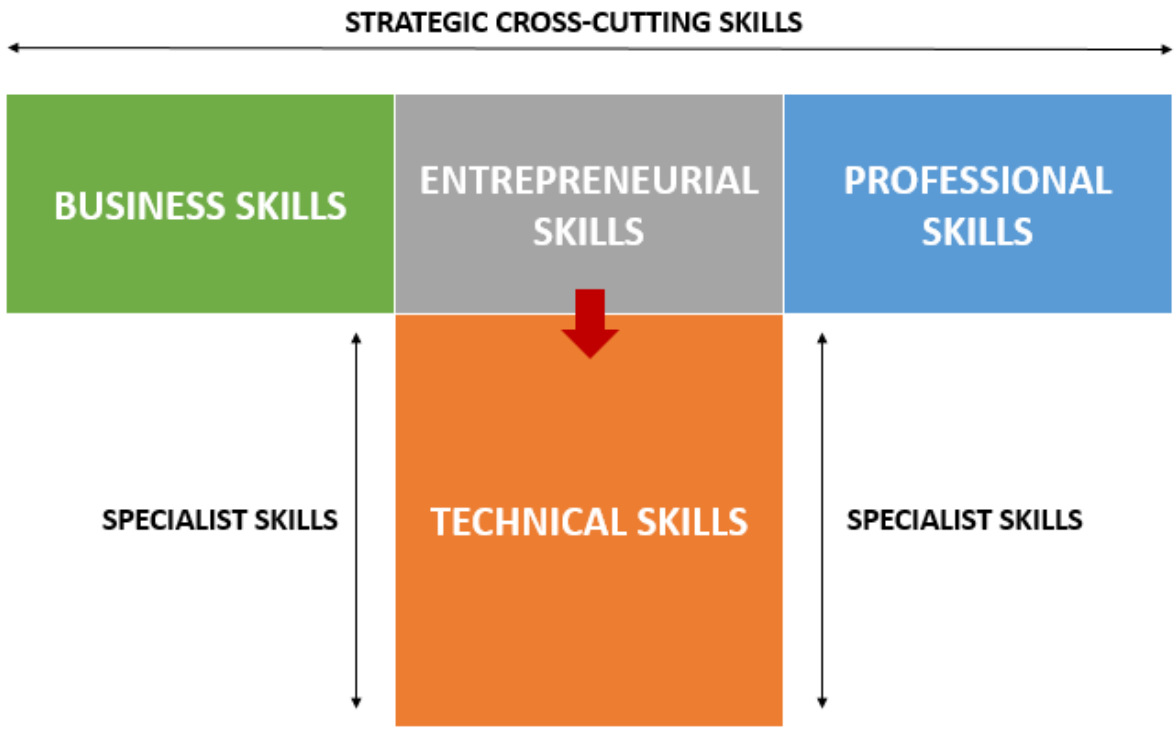

Figure 2 Model of the Innovator/Entrepreneur Engineer

The ***Business Management Skills*** cover the different aspects of the business engineering, intended as a systemic approach to the analysis and management of modern enterprise and group skills, such as:

- integrated vision of the business and its components
- evaluation of the multi-stakeholder performance of the company
- analysis of the scenario and the competitive context
- definition of the value network of the company for the co-creation of value
- planning and management of the business process system
- planning and management of the product-service components

- development and integration of organizational resources of business value

The ***Entrepreneurial Skills*** concern a "set of skills and attitudes for the identification and exploitation of technology business opportunities, such as:

- Strategic thinking and vision
- Identification and selection of "high tech" business opportunities
- Design and launch of a new "high tech" start-up
- Sense of initiative and “Risk management”
- Orientation to action and result
- Attitude to see problems as opportunities
- Strong sense of autonomy
- Attitude to face uncertainty and ambiguity
- Motivation, empowerment and scouting
- Problem solving
- Ability to adapt flexibly to changes

Professional Skills relate to planning expertise, strategic management, evaluation and operational organization of projects and programs such as:

- Systemic thinking
- Capacity for analysis and synthesis
- Leadership and creativity
- Communication
- Project and Program management
- practical resourcefulness
- vision and foresight

These strategic transversal competences are common for young people included in the different research projects, concerning different socio-technical systems, while the vertical competences, concerning the technical-scientific specialisations of the various Socio-technical Systems can vary.

The engineer, as an individual who knows how to apply science to solve a problem, has a "natural symbiosis" with entrepreneurship, as the term "entrepreneurship" derives from the French word “*entreprendre”*, which means "taking action".

The engineer is able to understand the processes of product development, but going from the laboratory to the market is not a linear process, and does not really enter with the technical expertise.

The entrepreneur is an individual who acknowledges an "opportunity" and finds the resources to launch a business that is an action. The entrepreneur knows how to manage ambiguity and uncertainty, is able of flexible thinking, and is ready to intrinsic changes to the comparison on the market.

The innovator/entrepreneur engineer is able to cross the “death valley” dividing the product development from its success, i.e. when customers are willing to spend for it.

In DHITECH's vision, the innovator/entrepreneur engineers are intended to be the first levers of change. They are trained in the "building sites" of social, environmental and economic innovation, where they develop scientific, technological and entrepreneurial creativity skills.

The “building sites” live their respective content specializations, but coexist in a sort of “ecosystem” from which they feed and, at the same time, they themselves contribute to fuel with new products, services and processes.

If the sites are identified in as many research projects, integrated into the respective Socio-Technical Systems, the ecosystem of the partners represented in DHITECH enhances and facilitates the conditions and processes for the production of economic, social and environmental innovation.

In the Socio-Technical Systems in question, the figure of the innovator/entrepreneur engineer is the focus, encompassing the overall meaning of the district strategy: a new professional figure able to fill the space that separates the product development from the product that is successful on the market.

Ultimately, ***DHITECH interprets the Integrated Training, Research and Innovation System created and developed as an “eco-system of innovative high-tech entrepreneurship” that integrates Socio-Technical Systems, and with respect to which DHITECH acts as a catalyst/orchestrator.***

2.2 The model of the innovative high-tech entrepreneurship ecosystem DHITECH pursues

The Ecosystem of Innovative High-Tech Entrepreneurship pursued by DHITECH is inspired by models of endogenous territorial growth, based on the creation, enhancement and diffusion of knowledge.

In this sense, the ecosystem is geographically located, but at the same time globalised, thanks to networks putting together individuals, researchers, technicians with different cultural and institutional extractions, working on the same issues.

It is possible to depict the ecosystem as a "knowledge factory": knowing, being able to do, knowing how to work together, being able to communicate with companies and institutions, knowing how to undertake, knowing how to be the best version of themselves.

NEEDS ANALYSIS FOR USER’S CATEGORIES	
PARTNERS	**NEEDS**
Universities and Research Centres	• research funding • partnership and sponsorship opportunities • experimentation (and financing) of applied research (the effectiveness and marketability of prototypes, industrial doctorates) • overcoming the death valley • finalized and professionalizing executive training projects • incubation of ideas and services for university spin-offs (commercial, administrative, tax, etc. hostings)
Big Companies	• public-private laboratories • construction of a network of subcontractors or 4.0 compliant customers • possibility of exploiting innovation opportunities from start-ups
SMEs	• Ability to know, organize and manage financed project opportunities • 4.0 qualified and updated human capital • capital/investors in debt or equity for innovation • hosting services

Professional Associations	• Services to members in the direction of development and innovation
Territorial Bodies	• socio-economic development of the territory • tools to support the innovation ecosystem, planning and implementation continuity • Dissemination of entrepreneurial principles, self-entrepreneurship, technological innovation
NOT-PARTNERS	**NEEDS**
Big Companies	• Hosting services
SMEs	• pre-incubation of ideas • establishment of innovative start-ups in "favourable" economic environments (basic, consulting, financial services, etc.)

DHITECH qualifies as the animator/orchestrator of this Ecosystem of Innovative High-Tech Entrepreneurship, which responds to the logic of glocalisation, and has as its basic mission the creation and feeding - through the "building sites" - of the capacity for development technologies related to the satisfaction of market and society needs. In this sense, the Ecosystem of Innovative High-Tech Entrepreneurship is deeply linked to the concept and the typical processes of the "User-driven Open Innovation".

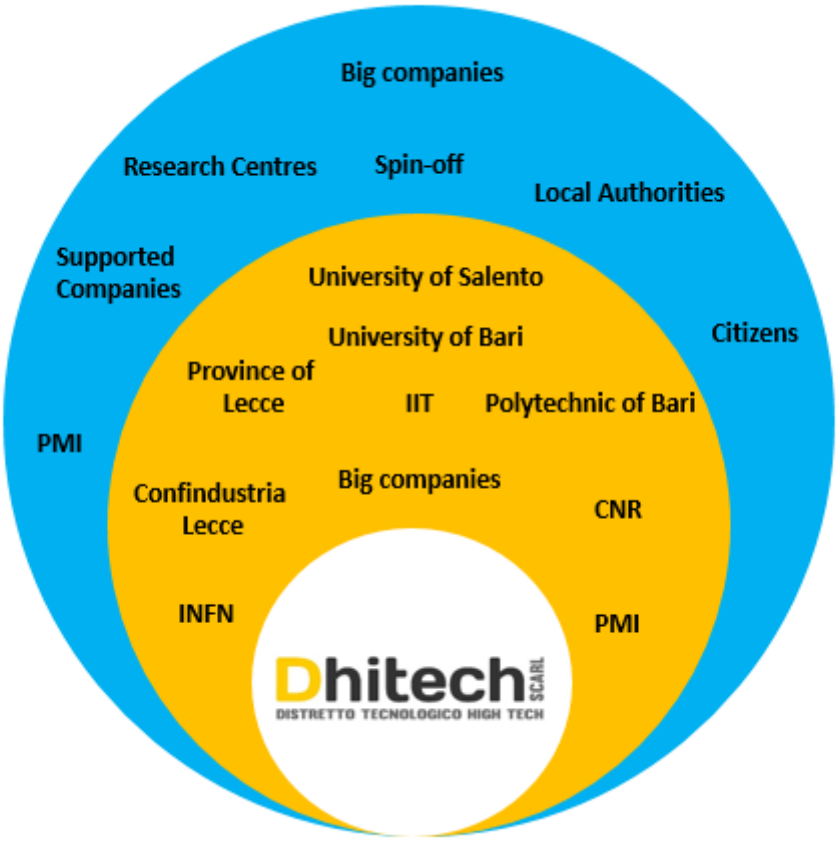

Figure 3 Regional Innovation Ecosystem

The ecosystem is based on four basic values:

- an authoritative and strong public-private partnership engaged in the development of technologies aimed at solving economic and social problems on a global scale
- an international mobility hinged on the networks of knowledge that, on a global scale, face similar problems
- an organization of Open Innovation Driven and User Oriented research
- a systemic and holistic approach in the analysis of problems and search for appropriate and sustainable solutions

DHITECH fulfils its role as animator/orchestrator of its own ecosystem also by integrating public instruments at regional, national and EU level, in support of research and higher education, and enhancing incentives and tools to support innovation, as well as financial instruments (i.e. seed capital and venture capital).

In addition, DHITECH identifies and encourages entrepreneurial skills, scientific and technological knowledge, developed and acquired on an international scale by public and private partners, as well as their research laboratories connected with the best national and international excellences.

To this end, DHITECH relies on private partners, who express excellence in industrial research, and are positioned on frontier production and technology supply chains, such as microelectronics, aeronautics, instrumental electronics, ICT, energy, biomedical technologies. DHITECH public partners express excellence in the context of national, European and international research, basic for the development of border solutions on the themes of nanotechnologies, tissue engineering, the Internet of the future, engineering of the extended organizations and automation engineering.

The strategic actions guiding the dynamics of the Ecosystem of Innovative High-tech Entrepreneurship are represented by an agenda of research, training and innovation initiatives, to be used as an environment to generate creative and entrepreneurial skills, connected to the enhancement of enabling frontier technologies, characterizing the District.

Project results are reflected in knowledge-intensive job opportunities, spin-offs, start-ups, opening of branches in the convergence regions, outsourcing of company functions and development of high added value services.

To this end, DHITECH priority processes allow to:

- Value industrial research projects as environments to create economic and social value
- Boost in the public-private researchers and young talents involved entrepreneurial mentality and behaviours
- Promote, during the realization Research Projects, the identification of opportunities for the launch of technologies, start-ups and spin-offs.
- Realise the Industrial Research projects, according to the best practices represented by the Living Labs (user-driven open innovation), in order to effectively involve the potential users of the project results in all the research stages.
- Experience innovative Higher education paths in the professional profiles of the human capital and in the processes competing to their realization
- Build innovative and optimal innovation chains, including high training, technology, research, business and entrepreneurship and explore and invest on innovative and economically sustainable opportunities, with benefits for society

- Create high-level training paths, developing skills to respond to the challenges for change, to uncertainty and complexity
- Train individuals with entrepreneurial attitudes and mind-set to work in synergy with companies
- Create new companies, both in existing sectors and in emerging and new ones
- Make a social impact in terms of job creation and quality of life

These processes has been supported by the use in all the projects of the District of the “user-centric” research methodology, introduced by Professor William Mitchell of MIT, called “Living Lab” and aimed at "sensing prototyping validating and refining" of complex solutions in multiple and evolving contexts of the real life.

2.3 Living Lab

The Living Lab approach has a flexible and adaptable approach acting as open participation laboratory with deep territorial connections. It fits communication channels, projects and technological tools to the participant audience.

The methodology includes analysis a needs mapping, starting on local scale, then the co-creation process begins based in response to needs identified in the previous stage.

The Living Lab methodology allows the implementation of four main activities:

- Holding together "technology push" and "application pull" in a diversity of visions and knowledge sharing, which support the conception of new scenarios, concepts and related artefacts.
- Involving all the actors, especially user communities, from the beginning of the co-creation process, in order to discover emerging scenarios, uses and behaviours, through life scenarios in real or virtual environments
- Realising the level of technological artefacts to experience life scenarios with a large number of users and collect data that are analysed in the evaluation activity. New ideas, innovative concepts, as well as artefacts, are assessed in real life through various dimensions: socio-ergonomic, socio-cognitive and socio-economic.

The “Living Labs” methods are adopted by DHITECH since they have proved to be a powerful tool for effectively involving users in all stages of research, development and innovation, thus contributing to the competitive growth of the regions.

2.3.1 Co-Creation Approach

- **Co-Experience:** citizens work together through communication tools both traditional and modern, in order to identify an individual or collective needs;
- **Co-Development:** together with suppliers of services, citizens work together to define a solution and a plan to meet the needs. In this phase, it may be provided solutions of the tests conducted directly by potential users;
- **Co-Delivery:** is a phase of interaction between users, developers and service providers, they are exchanged feedback on the progress and the adequacy of the solutions to the needs;
- **Co-Evaluation:** the citizens have the opportunity to constantly evaluate the services and their possible updating. Even at this stage, the interaction between service providers and users is direct.

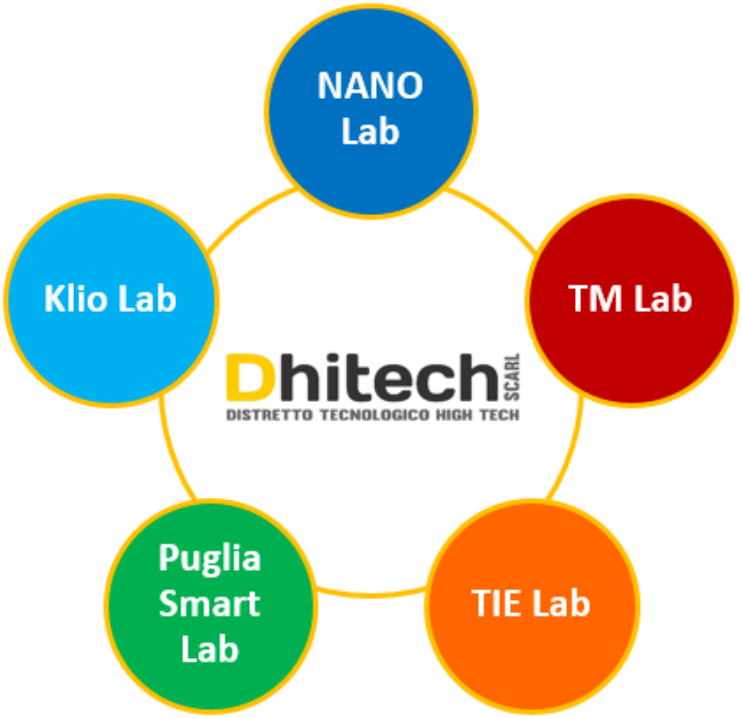

Figure 4 DHITECH Living Lab System

LIVING LAB TRACK RECORD	
NANO Lab	Active in the nanotechnology sector, to spread nanotechnologies in the production system.
TM Lab	Active in the field of enabling technologies for translational medicine, i.e. the technologies of innovative materials aimed at the realisation of different types of biomedical devices (for regenerative medicine, diagnostics etc.), to be launched for experimentation.
TIE Lab	Active in the management sector of new entrepreneurship, particularly involved in accompanying young people interested in enhancing ideas for setting up innovative companies.
Puglia Smart Lab	Active in the field of internet-based services with particular attention to the issues of smart communities.
Klio Lab	Active in the field of ICT technologies, aimed at the production of the manufacturing industry, in all its organizational, productive, logistical aspects, etc., according to the guidelines of the "Smart Factory".

The benefits of the “Living Labs” methodologies are summarised below, for different sections of DHITECH ecosystem figures:

For **users** in their roles as citizens and community members: they are in charge to impact services and products development, responding to real needs, and jointly contribute to processes, through active participation in the product/service lifecycle.

For **SMEs** and **micro-enterprises**: new ideas are developed, validated and integrated, their services and products are rapidly increased by moving from local markets to other markets.

For **big companies**: the innovative process becomes more effective, through alliances with other companies, and early interaction with end users, rooted in active user experience, thus increasing the chances of the new product/service break through already at its appearance on the markets.

For **those involved in research, in the economy and in society**: the partnership between businesses, citizens and governments is established, coming over to a real ecosystem of innovation and flexible service, which integrates social and technological innovation, and increases productivity of R&D investments.

3 DHITECH as orchestrator of its high-tech innovative entrepreneurship ecosystem

Here are described the strategic and operational processes referred to DHITECH as a facilitator and accelerator of structural changes in Puglia, through the orchestration of the High-Tech Innovative Entrepreneurship Ecosystem.

DHITECH implements the functions of both Staff and Strategic Steering Committee, which make efficient and effective the processes to:

- Enhance industrial research projects as environments to create economic and social value
- Stimulate in public-private researchers and young talents involved entrepreneurial mind-set and behaviour
- Encourage during the realization of Research Projects the identification of opportunities for the launch of technologies, start- up and spin-off
- Realize the Industrial Research projects, according to the excellent practices of the Living Labs (user-driven open innovation), in order to effectively involve the potential users of the project results at all stages of the research
- Experience innovative Higher education paths in the professional profiles of the human capital and in the processes involved in their implementation
- Build innovative and optimal innovation chains, including high-level training, technology, research, business and entrepreneurship, exploring and investing in innovative and economically sustainable opportunities, with benefits for society
- Develop skills to respond to the challenges of change, uncertainty and complexity Form and develop individuals with entrepreneurial attitudes, to work in synergy with companies
- Create new businesses, both in existing and in new and emerging sectors
- Make a social impact in terms of job creation and quality of life
- Constantly monitor the positioning of people and research groups in terms of:
    - impact in the specialized literature
    - contribution to the economy and society
- Support research groups in guiding their research, development, training and innovation efforts, also in coherence with national and community policies for young people, employment, development and innovation.

In order to make the “glocalization” processes effective by combining the “Triple Helix” model with the “Living Lab” methodologies:

- DHITECH takes care of strategic functions aimed at promoting Regional partnerships for innovation (i.e. private public partnerships) addressed to the identification of productive specializations of the Apulian companies' networks, enhanced by research and development interventions and innovation processes, facilitated also by including young researchers in small and medium-sized regional enterprises.
- Dissemination of the innovation culture, youthful and innovative entrepreneurship and incentives for the creation and development of technological start-ups and innovative companies.
- Placement of young people and researchers from Puglia in knowledge-intensive jobs
- Training of managers and entrepreneurs, investments in industrial research and training, Regional Partnerships for Innovation, Research Doctorates, Research Grants and Aid for newly created innovative small businesses.
- Continuous monitoring of the results achieved and to be pursued, especially in view of:
  - Promotion and assistance for patenting, participation in national and community calls, "glocal" networking
  - Promotion and assistance, in key of entrepreneurial development, to the participation to regional tenders, intra- and inter-regional networking, and Regional Policies for Youth, for the Work, for Development and Innovation.

4 Current DHITECH structure

Due to its attractiveness, the DHITECH recorded a significant evolution with respect to its initial corporate structure. This evolution has led to the current configuration, represented below, in which even the new members have a long and consolidated experience in public-private research relationships.

- **Public Members**
  - University of Salento
  - National Research Council (CNR)
  - National Institute of Nuclear Physic (INFN)
  - Italian Institute of Technology (IIT)
  - University of Bari A. Moro
  - Polytechnic of Bari
  - Province of Lecce

- **Private Members**
  - Altea Spa
  - Clio Srl
  - Confindustria Lecce
  - DW Informatica Spa
  - Engineering Ingegneria Informatica Spa
  - ESI ITALIA Srl
  - Exprivia Spa
  - GE Avio Srl
  - Ghimas Spa
  - Links management and technology Spa
  - Nuovo Pignone Srl
  - Ospedale San Raffaele Srl
  - STMicroelectronics Srl

- TOZZI GREEN Spa

In addition to its public and private partners, the DHITECH ecosystem is composed of other realities born from the research activities that have been conducted during the life of the District and that today are physically present within the Technological Hub managed by Dhitech. These are in particular the following SMEs that develop products and services in the ICT and biomedicine fields, with particular attention to the research world:

- Advantech Srl
- Apphia Srl
- BeMint Srl
- Caresilk Srl
- Eka Srl
- Naica Srl
- Senso Scarl
- Typeone Srl
- ZeroDD Scarl

From this structure emerges that:

The public partners build up a committed critical mass at national, European and international level, in the context of research for the development of disruptive solutions.

The private Members express industrial and research status and are positioned on frontier production and technological supply chains, like microelectronics, aeronautics, instrumental electronics, ICT, bio-medical technologies, energy. They not only have senior positions at the national level, but also leadership roles within the European technology platforms.

Currently, the Dhitech has an agile, program and project based organization, with the role of partners' coordination.

Specifically:

- the DHITECH strategy is led by the President and is carried out by the Board of Directors, made up of highly experienced and high profile staff, coming from the partners' structures;
- the design of the research activities is entrusted to the research and development staff of both the public and private partners, and coordinated by the project managers, expression of the District itself;
- the realization of the projects is carried out through assignments signed by the partners and on specific work packages, related to the project research and training activities;
- the technical-economic control is carried out by the Dhitech, through a professionally qualified unit for the control of the progress, and directly supervised by the Director;
- the dissemination of the results is coordinated by the President and the Board of Directors, and completed by the researchers of the partners involved in each project.

5 Activity Areas

DHITECH has focused its strategy on the following three lines of business:

a) Technological innovation and know-how transfer,

b) Management and promotion of the Technological Building,
c) Project/Program Management,

and on the transversal strategic area represented by the management and technical area.

Based on this strategic approach, the business lines and the strategic area are detailed below:

A. **Technological innovation and know-how transfer**

- Development of the competitiveness of the territorial production system, through the design and management of Research, Innovation and Training Projects, involving various public and private actors of the Ecosystem of innovation, based on KETs (Key Enabling Technologies), Micro-Nano electronics (e.g. Smart, Secure and Inclusive Communities), Nanotechnologies (e.g. Energy and Environment) and Biotechnologies (e.g. Precision Medicine);
- Transfer of research results to the production system;
- Attracting public and private investments in research, development and innovation;
- Support for the birth of new innovative companies;
- Training of new professionals with technological, managerial and entrepreneurial skills.

B. Management and promotion of the Technological Building

- Management, development and promotion of the Hub, equipped with state-of-the-art technological infrastructures, place of innovation and know-how transfer, within which developing new specialized skills;
- Collaboration and synergy between "residents" and other territorial realities;
- Promotion of events to stimulate dialogue between researchers, entrepreneurs and institutions according to the Living Lab and Open Innovation methodology;
- Dissemination of research results.

C. Project/Programme Management

- Project Management of Research, Innovation and Training projects financed by Community, National, Regional Programs (design, presentation, management and reporting);
- Consultancy activities for companies, organizations, research centres and universities on research, innovation and training projects.

Transversal strategic area represented by the management and technical area

- Accounting, administrative, fiscal, financial activity;
- Budgeting, forecasting and management reporting activities;
- Management of Boards;
- Supervisory duties and relations with the competent bodies;
- Privacy related obligations;
- Communication;
- Relations with Members, Institutional Bodies, etc.
- Procurement;

- Secretarial activities:
- Management, maintenance, control and security of the network
- Management of the hardware and software infrastructure of telecommunications
- Management of hardware infrastructures, basic and environmental software, middleware and special devices that ensure the operation of all information systems

System management of the software in use.

6 From Pre-Incubator to Diffused Accelerator

In order to intercept the funding opportunities resulting from regional, national and European calls, it could be interesting to structure and organize a network of professionals dedicated to the incubation and acceleration of start-up companies. DHITECH, by involving other operators and accelerators as well as business angels and venture capital, could propose itself at a territorial level as a reference actor for the bio-technologies and 4.0 industry sectors.

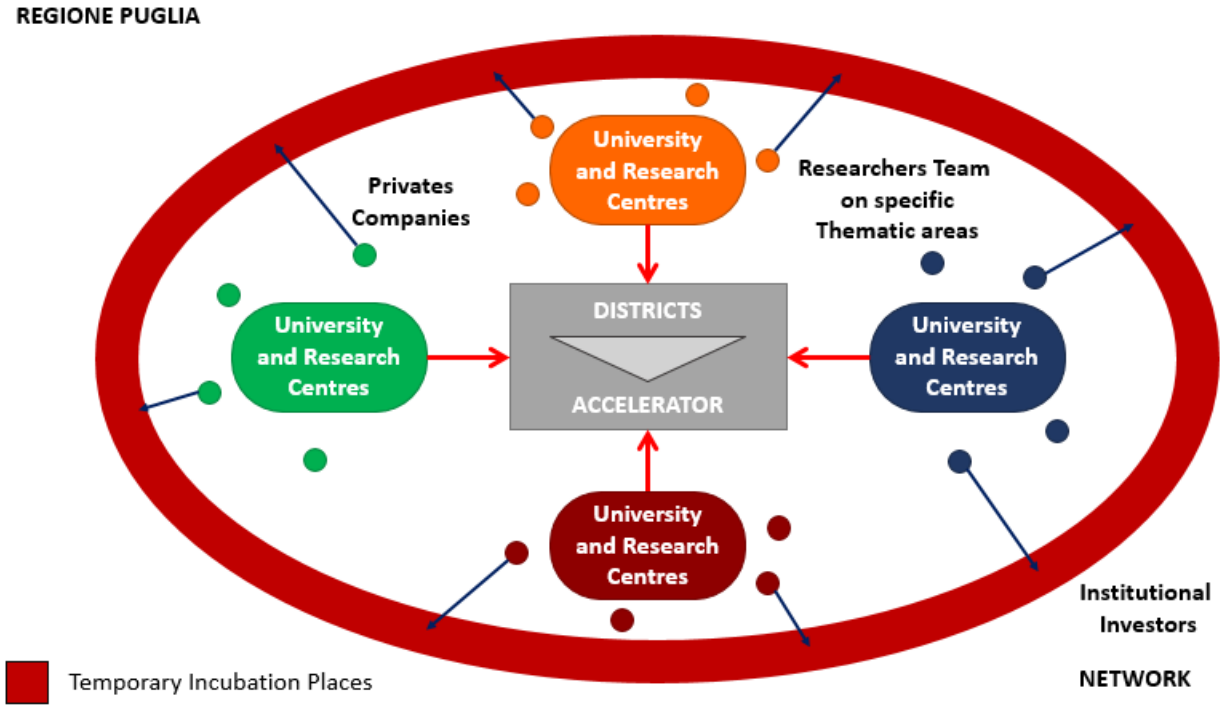

Figure 5 DHITECH as diffused Accelerator

Stable/experimental organization, as a physical place where to provide services of:

- Facility (logistic, administrative, legal, etc.)
- Skills (technological, market, organizational, etc.)
- Capitals (innovative banks, private equity, venture capital, etc.)

7 DHITECH as a physical building and services offered

The DHITECH building was designed and built by the University of Salento and delivered to the Dhitech in 2014. It has an area of about 5,000 square meters, divided into 3 blocks linked to each other and distributed on 3 floors used as offices and laboratories, a basement used as technical rooms and a terrace used to host the technological systems. From 2014 to today, various companies and PAs have been included in it, and, to date, it is almost completely saturated.

Below, the allocation of spaces is represented, floor by floor, for a total of about 20 companies. The following table shows the square meters used by each individual sub-borrower and the active users:

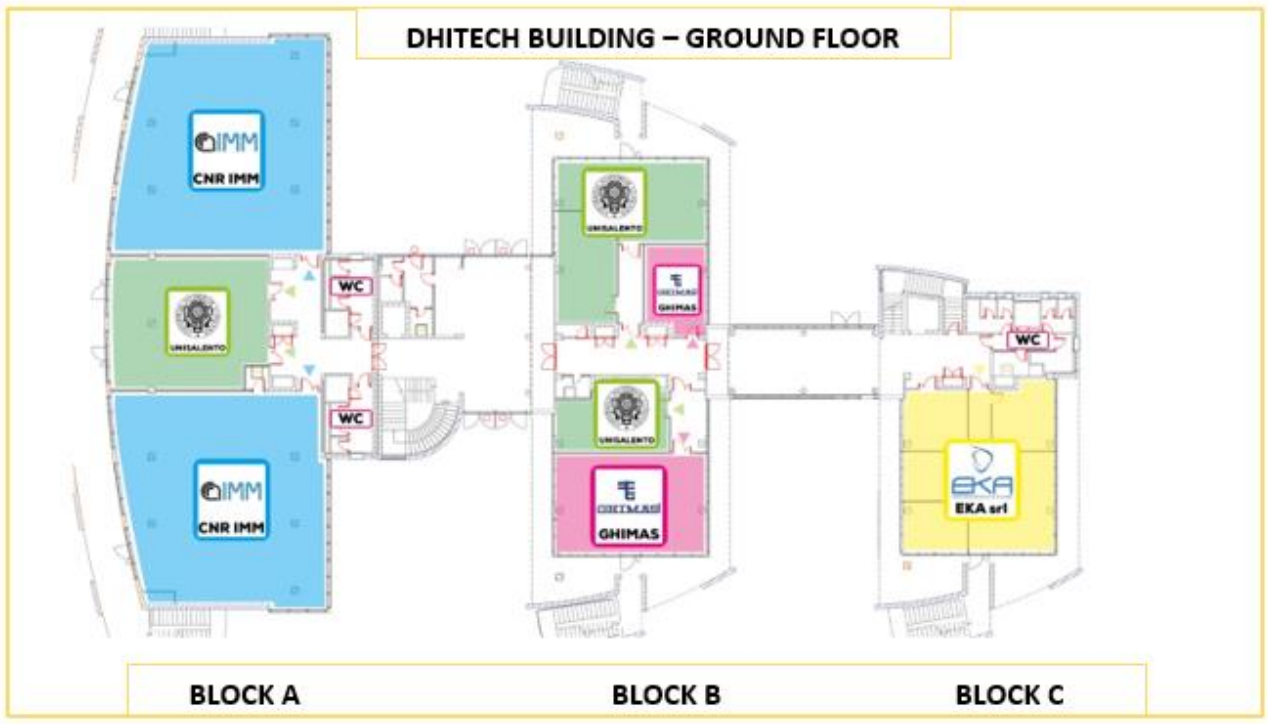

Figure 6 DHITECH Building – Ground Floor

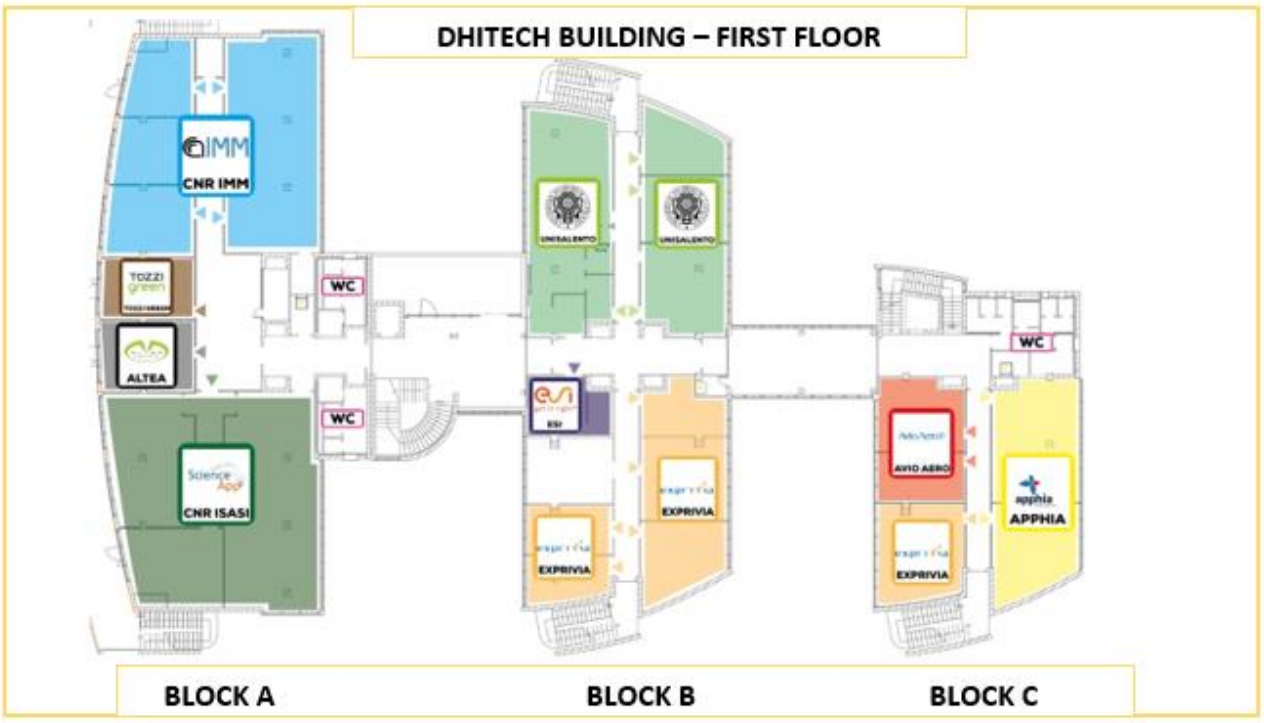

Figure 7 DHITECH Building – First Floor

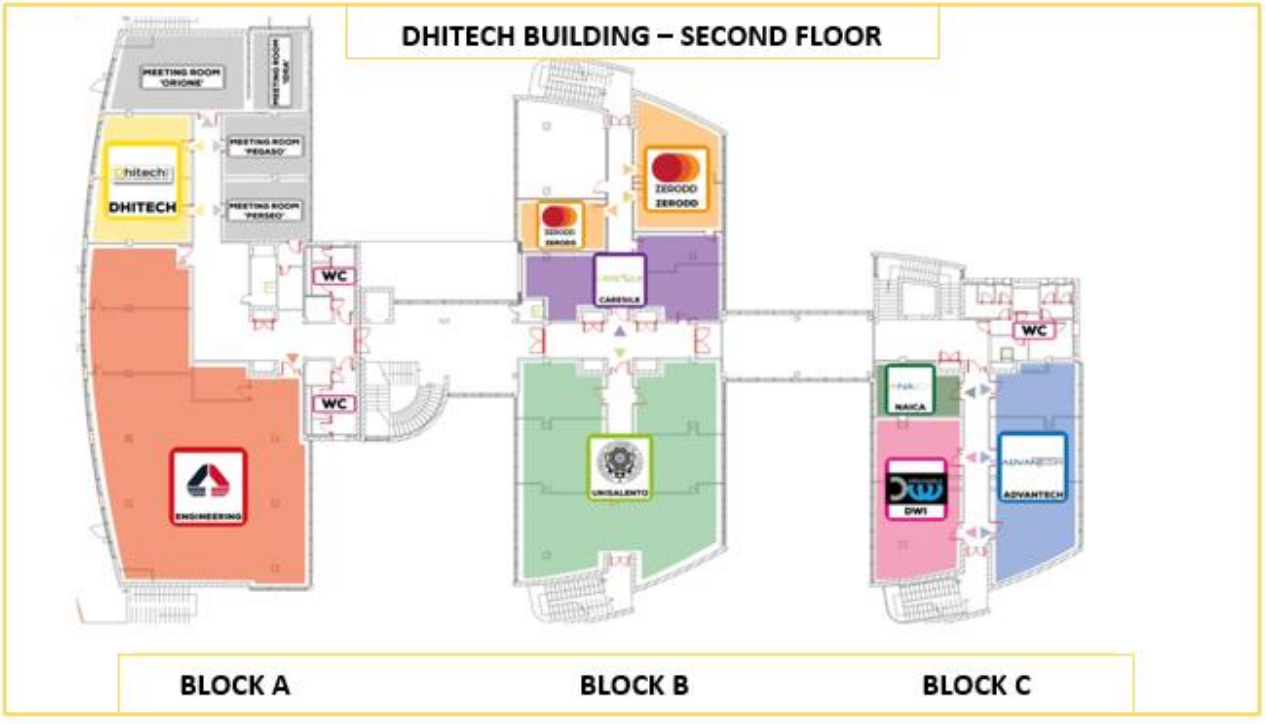

Figure 8 DHITECH Building – Second Floor

DHITECH Space allocation and e utilities at 15/11/18

Company/Institution	Square Meters Occupied	Users
Company/Institution 1	103	4
Company/Institution 2	41	6
Company/Institution 3	111	8
Company/Institution 4	62	0
Company/Institution 5	78	5
Company/Institution 6	748	16
Company/Institution 7	220	10
Company/Institution 8	99	9
Company/Institution 9	80	2
Company/Institution 10	142	48
Company/Institution 11	351	63
Company/Institution 12	26	3
Company/Institution 13	214	33
Company/Institution 14	126	1
Company/Institution 15	27	9
Company/Institution 16	48	3
Company/Institution 17	131	1
Company/Institution 18	614	14
Company/Institution 19	94	15
TOTAL	3315	250

The average daily users are about 250, these data refer to the operational and structured users, who have access to the services offered by DHITECH downstream of the company's request; the totality of users, collaborators, guests who attend the building daily is greater. The building management covers many aspects, from space management to plant management, access, security, maintenance and interventions in case of breakdowns. The plant building will be listed below, and for each plant the most significant aspects are indicated, for the purpose of their management.

7.1 The Plant Building

7.1.1 Structured wiring - District ridges

The DHITECH building, located inside the Campus Ecotekne, is connected to other buildings of the Campus through paths consisting of 2 cables of 24 Single-channel FO; the sections connecting DHITECH to the star centre of the Campus (c/o *Fiorini* building) and the Datacenter of the Dhitech (c/o *Aldo Romano* building) have been created through redundant paths. Further connections were also made to strengthen the Unisalento interconnection infrastructure with a view to synergy and collaboration.

7.1.2 Structured wiring of the building

The building is equipped with a structured cabling, consisting of single-mode FO backbones and CAT 6 distribution. The project has led to the construction of:

- 1 Building Star Centre, built in the basement
- 10 Flat Star Centres, located in the building and linked each other through 10 Gbps internal backbones with redundant path of 12 fiber optic pairs.

The Star Centre of the building has been connected to the Campus Star Centre with a path of 12 pairs of 10 Gbps Fiber Optics and to the Datacenter with a redundant path of 24 pairs of 10 Gbps Optical Fiber. 1240 data records were made in the various floor Star Centres. The IT staff at DHITECH dealt with the design of the building's structured wiring, analysing the environments and determining the infrastructural needs. Below, a diagram of the building backbones built:

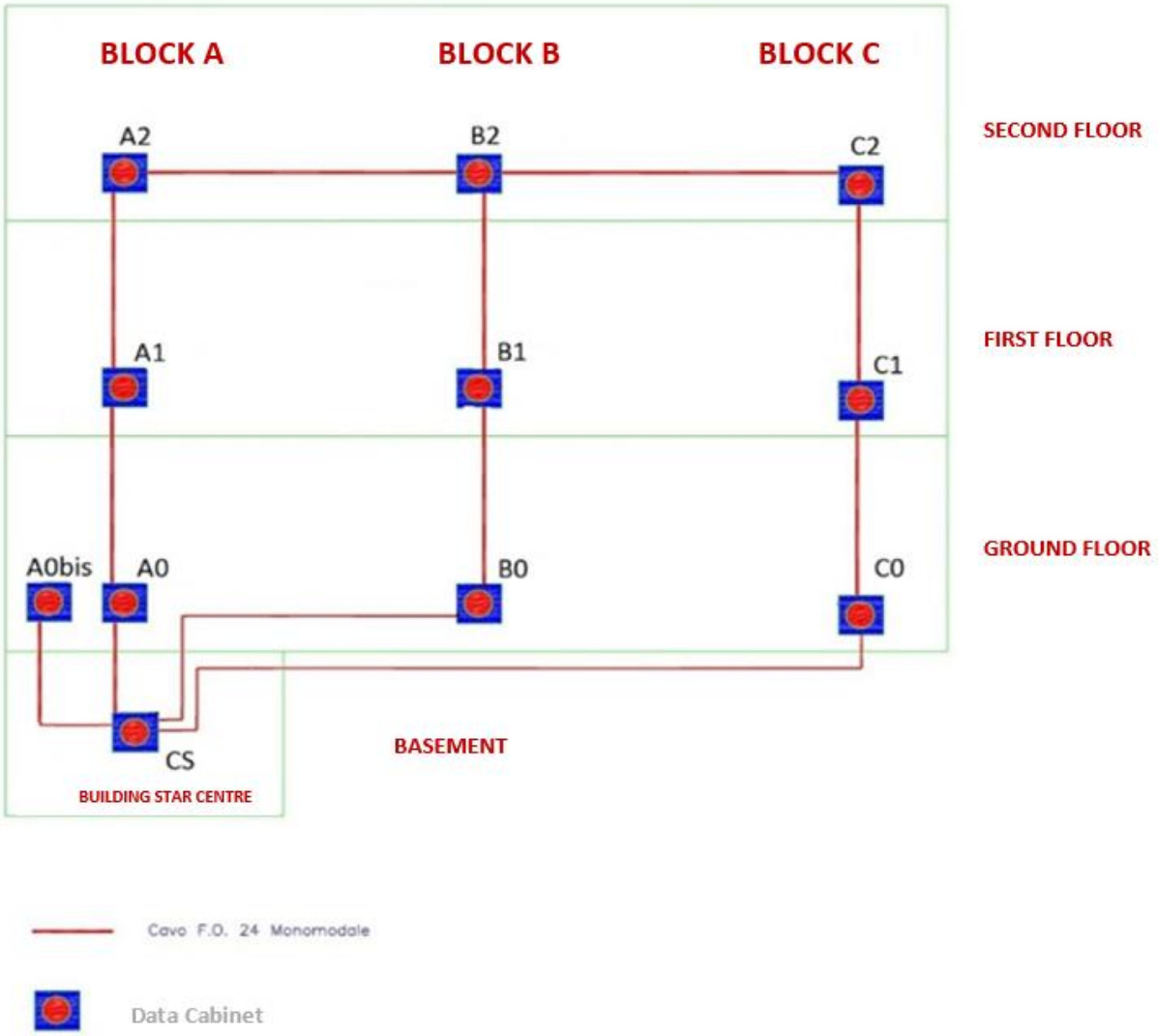

Figure 9 Building backbones diagram

The active part of the network consists of 20 floor switches, installed inside the data cabinets of the individual star centres; 10 of the above switches are equipped with Power Over Ethernet technology to enable the devices that support this technology to be powered directly by a single Ethernet cable; all the APs in the structure are connected via POE. The building's network has been entirely taken care of by the IT staff, its design and installation, over the years the installation and interconnection of equipment owned by sub-loaned companies has been ensured.

7.1.3 Conditioning System

The building is equipped with a series of Air Handling Units (AHU) of 2 different suppliers (LG and Daikin) installed on the terrace of the building and distributed in the 3 blocks. They are connected to over 120 air conditioning units, located within the different offices/laboratories and common areas. A further AHU and 3 conditioning units deal with the cooling of the Building Star Centre. The air conditioning units are managed by 6 Controllers, installed in the cavities of the 3 blocks, on the ground floor. The IT staff formed autonomously the functioning of the 2 systems and proceeded with the inventory of the individual units, mapped them according to their environment and subdivided them into groups, according to their intended

use. In this way, 34 groups were created to manage the building in a sectorial way and, for each of them, an independent program was created, consisting of 4 modalities for each individual group.

The system requires continuous reprogramming interventions, as the allocation of space by individual companies varies, especially in the last period, with the entry of new companies and the expansion of others.

7.1.4 Alarm system

The building has been equipped with an alarm system, based on buses and dual technology sensors. The installation of the sensors has been made, identifying the best location inside the building. This system also requires a continuous reprogramming of the control panel, also in order to allow individual companies to autonomously insert and disarm the system in their environments, through the use of 6 control keypads distributed in the building. A series of automations has been defined to allow the insertion and disarming of the system in the common areas and in the individual companies' ones (where required), in working hours, and the management of insertions on weekends or outside the working time. The DHITECH alarm system counts 90 sensors (optical or contact); 6 control keyboards; 19 programs and 24 codes; 6 hourly schedules.

The plant has been reprogrammed several times over the years, to align with the changing spaces and needs of the various sub-borrowers. The IT staff also deals with interfacing with the Campus's supervisory institute in the event of alarms inside the building and at the same time providing the names of any users who need access to the Campus outside of the business hours of the building. same. At present, in the event of an alarm, the Supervisory Institute calls the IT staff, with the purpose of verifying *ex-ante* whether or not it is an alarm; these events may occur (and have already occurred) both during business hours and during the weekend or in the evening or at night.

7.1.5 Fume Detection Plant

The DHITECH building is equipped with a dual technology smoke detection system (optic and thermal), consisting of a control unit, 340 detection sensors and 34 alarm activation buttons divided into 6 loops and 22 zones.

The know-how on the management of the power plant, acquired through the interactions with the installation company, allows the control of the central unit independently, configuring the exclusion of sensors, according to needs (for example, in the case of interventions inside the building, which could cause sensors, faulty sensors, etc. to be activated. The DHITECH fire-fighting unit has been connected to the fire-fighting systems of the 2 Clean Rooms housed inside the building.

7.1.6 Electrical system and system for accounting for consumption

The building is connected in MT to an electric substation of the Campus, located at *Villa Tresca*; in a basement of the building there are 2 MV/LV transformers of 650 KW. Each transformer supplies the electrical energy on 2 independent systems, in fact there are two building General Electric Panels (EP). Each plant is developed in levels, first by floor, then by block. The distribution of the feeding takes place through 2 slots located in body B (Floor General EP), which the peripheral EPs are connected to. Peripheral EPs power the EPs installed in each environment. The building is equipped with 2 General EP, set in the electric substation, 6 General Floor EPs, 12 peripheral EPs and approximately 40 EPs, installed in the laboratories or offices.

All the consumptions related to the laboratories and offices are measured by a dedicated infrastructure realized through the CE² project that has made the installation possible, both at the level of general electrical panels, and at the level of the electrical panels of the floor and peripheral, of a series of meters. The meters, certified by a European directive (MID/2008), allow the calculation of consumption both at the building level

and for each single room used as a laboratory or office. The consumption, due to the common services (corridors, external lights, toilets) is distributed according to the principle of the square meters used. There are about 12 electrical panels dedicated to measuring instruments, these panels allow the control of about 90 power lines.

7.2 ICT infrastructure

DHITECH technological infrastructure was realized through an infrastructural PON (CE^2) project that allowed DHITECH to create a state-of-the-art infrastructure, to offer a series of services at a high technological level, continuously monitored and characterized by high performance. The training of the IT staff was also planned. At the time of implementation, it consisted of 4 units, thanks to whom an autonomous management of all the aspects was ensured, over time 3 interns became also part of the team. System activities are carried out exclusively by internal IT personnel and refer to the implementation, configuration, management of IT components and related services in production, from needs analysis and infrastructural sizing, to the purchase phases of technological assets, to the infrastructure installation.

In addition, DHITECH, thanks to the high technical background of the IT staff, has created its own Datacenter, designed and managed in total autonomy.

The infrastructure consists of 4 macro areas:

- Datacenter: Composed of an integrated complex infrastructure, electrical distribution, the subsystem of environmental sensors, conditioning and monitoring;
- Calculation infrastructure: very advanced physical and virtual infrastructure, able of constantly adapting to the multi-corporate reality of DHITECH;
- Network & Security infrastructure: multi ISP corporate network, based on the SDN and BYOD paradigms and able to offer the highest security standards, adapting to the different needs of the individual sub-loaned companies;
- VoIP infrastructure: Over IP telephony infrastructure, able to offer to the hosted companies a modern and high quality voice service;

The infrastructure was designed and built thanks to the contribution of important system integrators on the market, all the installation and implementation phases allowed the IT group to acquire all the necessary skills for managing and monitoring this important component. Where it became necessary, autonomous training was provided.

7.2.1 Datacenter

The datacenter allows to provide, with a very high level of SLA, the “core” services of the DHITECH and those made available to the sub-loaned companies. With a view to significantly reducing construction costs, it was decided to exploit and enhance an existing operating infrastructure within the *Aldo Romano* building. Even this datacenter was in the past designed and implemented by some of the IT staff members; 2 separate computing infrastructures were built within the same data center infrastructure after an analysis of the cooling, power supply and electrical continuity requirements.

DHITECH's datacenter infrastructure is based on one of the most advanced systems offered by the various vendors, namely Schneider Electric's InfraStruXure. This system is based on a modular and scalable architecture, for high density systems, that allows the total integration of power supply components, cooling, distribution and electrical continuity and offers an advanced centralized management system.

InfraStruXure uses a system for containing and disposing the heat generated by a thermic exchange corridor (Hot Asile Containment) allowing the equipment contained in the datacenter to always operate at the best operating temperature, thus leading to a significant reduction in electricity supply costs.

The datacenter is able to provide services in HA with a redundancy of almost all the infrastructure components, in fact the existing infrastructure has been enhanced by the inclusion of an additional modular UPS and scalable up to 160 kW and configured in N + 1 mode, capable of guaranteeing autonomy in the event of a power failure of 3 hours.

Below, the main features of the implemented electrical distribution solution:

- Management of redundancy in N + 1 configuration.
- Power factor correction: kVA = kW.
- Redundant intelligence modules to promote a high level of availability of loads by providing redundant communication paths to the critical functions of the UPS.
- Power supply modules connected in parallel to increase availability and allow immediate and seamless recovery due to isolated module faults.
- Battery modules connected in parallel to guarantee a high level of availability.
- Hot-swappable power modules.
- Hot-swappable intelligence modules to ensure a clean and uninterrupted power supply to the protected devices.
- Hot-swappable batteries.
- Modular design to make assistance interventions faster and reduce the needs of
- maintenance, the modules are self-diagnostic and can be replaced on site.
- Management via the network: allows remote management through a web application.
- Automatic internal bypass for supplying the mains power to the connected loads in case of UPS overload or failure.

14 electrical distribution units have been used to ensure redundant power supply on 2 distribution lines of the equipment installed inside the racks. In addition, to ensure greater operational continuity to equipment without a redundant power supply, 2 Active Transfer Switches (ATS) have been used to automatically switch the power source supplied to the devices connected to them.

Having to host high density systems, resulting in high heat production, 2 additional high power InRow modular cooling units connected to the redundant chilled water cooling system have been integrated. In addition, to improve the efficiency of the aforementioned air conditioning system, the route to and from the datacenter has been redesigned, by introducing a thermal flywheel. An electrical upright was also made from the general electrical panel to the UPS and the installation of an automatic circuit breaker and a protection block capable of supporting a load of at least 64kW. The installation and configuration of a software environment was also carried out, which allows, in addition to the advanced and real-time monitoring, the management and planning of the positioning of new hardware within the infrastructure (Capacity planning). All servers, network devices and storage components are hosted in the datacenter.

The whole infrastructure is autonomously managed and monitored by the IT staff, who is also involved in assisting and orchestrating ordinary and extraordinary maintenance operations. Below, a software extrapolation of the DHITECH datacenter infrastructure.

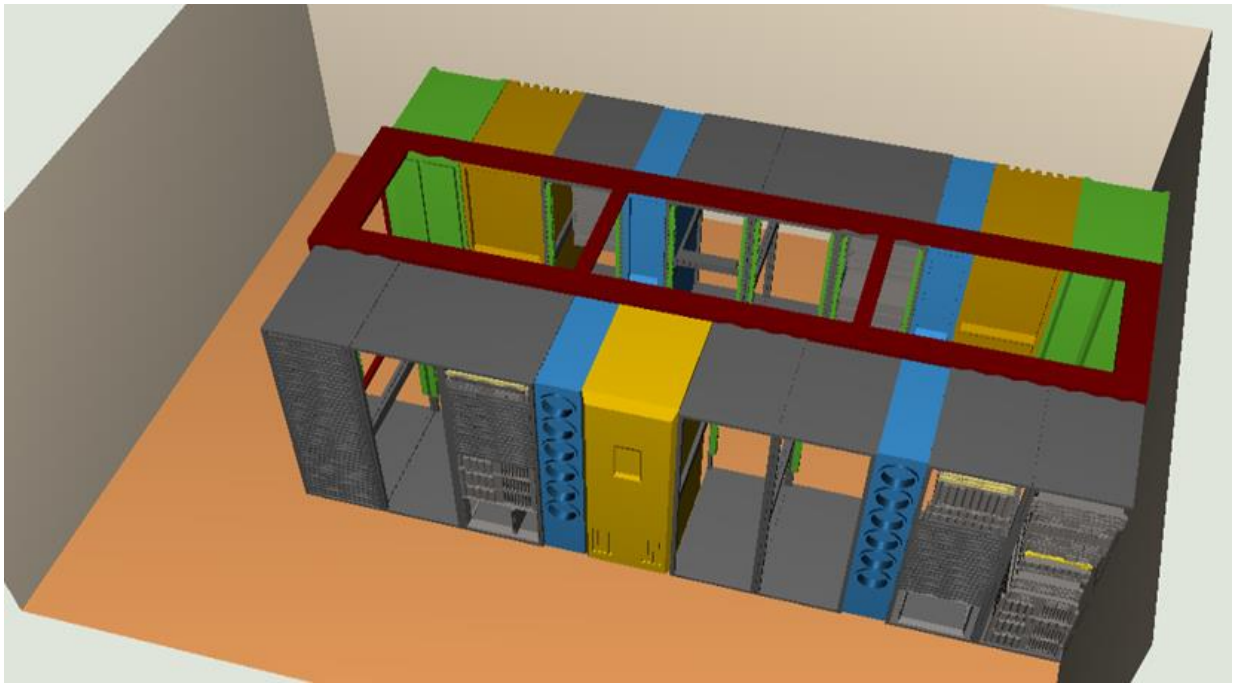

Figure 10 Section of the datacenter infrastructure

The following figure illustrates the layout of the datacenter.

Figure 11 Data center layout

7.3 Computing Infrastructure

The DHITECH computing infrastructure has been designed according to the most modern canons of Hardware and Software abstraction, with the aim of obtaining the advanced convergence and scalability of computation, storage and network components.

The study of existing technologies and the analysis of calculation needs have led to the identification of the systems to be used for the provision of the core" services for companies. The infrastructure was created by seeking the highest standards of High Availability, Load Balancing and computational performance, to ensure the optimal business continuity.

The deployment of the computing infrastructure involved the IT group, starting from the design phase, with the drafting of the technical specifications related to the purchase procedures, the physical installation of the components, the configuration and customization of the systems, up to optimization and tuning.

The solutions used include Cisco's UCS, PureFlex and NeXTscale from IBM, which are joined by 2 Enterprise-level Storage systems, again developed by IBM: Storwize v7000 and Storwize v3700.

Below, the systems in use.

- **CISCO Unified Computing System (UCS)**: represents the “beating heart” of DHITECH's computing infrastructure and enables a unified and integrated systems management, providing a programmable and intelligent infrastructure, able to simplify and speed up the distribution of applications and business services running in bare-metal, virtualized and cloud computing environments. The unified I/O infrastructure uses the low-latency, high-bandwidth Unified Fabric architecture to support network traffic, management, and storage I/O. The Cisco FEX (Fabric Extender) technology directly links the Unified Fabric to servers and virtual machines, enabling improved performance, security and manageability. All this translates into a scalable and high performance provision of services, optimizing the resources within the datacenter, reducing the components to be fed and cooled and consequently the costs to be faced. The UCS infrastructure is based on a Cisco UCS chassis that houses 8 blade biprocessor servers, equipped with 20 cores per blade, 256 GB RAM, 4 redundant power supplies and 8 10 Gbps connections to FEX. It is supported by 2 redundant Fabric Extenders that ensure the interconnection of the chassis with the storage infrastructure and host the “intelligent” part of the system, as well as representing the interconnection nodes of the infra-datacenter.
- **IBM PureFlex**: Redundant chassis equipped with 10 blade biprocessor servers with 16/20 cores per blade, for a total of 184 cores, 128 GB RAM, 2 10 Gbps connections, HDD 2 X 120 GB SSD, access to storage via iSCSI with 8 10Gbps path to the core infrastructure router. This High Performance computing infrastructure was created to host production and development platforms. At the moment it hosts a second virtual environment, built entirely on open source platforms. As well as the UCS ecosystem, PureFlex is also completely redundant in its hardware components and has a LUN dedicated to it in the Storage infrastructure.
- **IBM NeXtscale**: The GPU Computing infrastructure is designed to meet the design needs that require an advanced computing environment based on a GPGPU infrastructure. It is equipped with 5 biprocessor blade servers, equipped with 20 cores per blade, 256 GB RAM, 2 connections at 10 Gbps, HDD 4 X 150 GB SSD and access to storage via iSCSI assisted by GPU nVdia k1, k2 and k80. This infrastructure has been designed for the use of advanced computing in various scientific fields (Physics/Mathematics/Distributed Calculation/Cryptography).

- **Storwize v7000 and Storwize v3700**: Orienting towards the hardware abstraction paradigm, it was decided to physically untie the "data" from the processing system that generates it. To get on with this paradigm, it was decided to use 2 enterprise-level SANs, with both redundant controllers and HA with a double 10Gbps link for each controller. The installation, connection, configuration, sizing and advanced tuning of the 2 storage units was performed entirely by IT staff who, starting from the infrastructural needs identified, proceeded to carry out the storage design phase. The v7000 has been equipped with 24 x 600GB disks with 10K rpm SAS technology and 12 3TB disks with 7.2K rpm SAS technology. The SAN houses a LUN (Logical Unit Number), consisting of a raid5 disk pool, used as the main container of the virtual cluster managed through the Cisco UCS system. An additional LUN has been dedicated to host data from the company fileserver used by DHITECH. The v3700 was equipped with 16 x 300GB disks with 15K rpm SAS technology, 8 x 600GB disks with 10K rpm SAS technology and 12 3TB disks with 7.2K rpm SAS technology. This SAN was dedicated to hosting backups of the virtual infrastructure, according to differentiated retention policies.

7.3.1 Virtual infrastructure

DHITECH's production environment and development environment was built on a Virtual High Availability Cluster, using 4 UCS blades. The Cluster, based on VMWare technology, is completely orchestrated, managed and monitored by IT staff. The virtual infrastructure makes it possible to optimize the available hardware by abstracting it from the systems executed by it; it is a high-performance, redundant and scalable computing environment completely dedicated to business-continuity; exploits resources distribution mechanisms following the best practices in terms of scalability and fail over.

Currently, the number of used VMs is as follows:

- 40 Virtual Machines based on heterogeneous systems (Unix-based / Microsoft / Cisco) that are part of the production environment of DHITECH. These VMs are responsible for providing "core" services and those for sub-borrowers;
- 23 Virtual Machines, also based on heterogeneous systems, which are part of the DHITECH development environment. These VMs represent the test and pre-production environment and allow the development of platforms before entering the final deployment phase;
- 8 Virtual Machines based on Unix systems that host the infrastructure used in the past for the services offered as part of the BrindisiSmartLab project.

The environment integrates 8 heterogeneous datastores and 20 vLANs to allow the isolation of the various systems. All of the above Virtual Machines physically reside on a SAN connected by a double iSCSI path. This allows the individual VMs to be independent of the node of the host, allowing hot migration of the same in case of a hardware fault.

Below, the map of the relationships shows the complexity of the infrastructure described above:

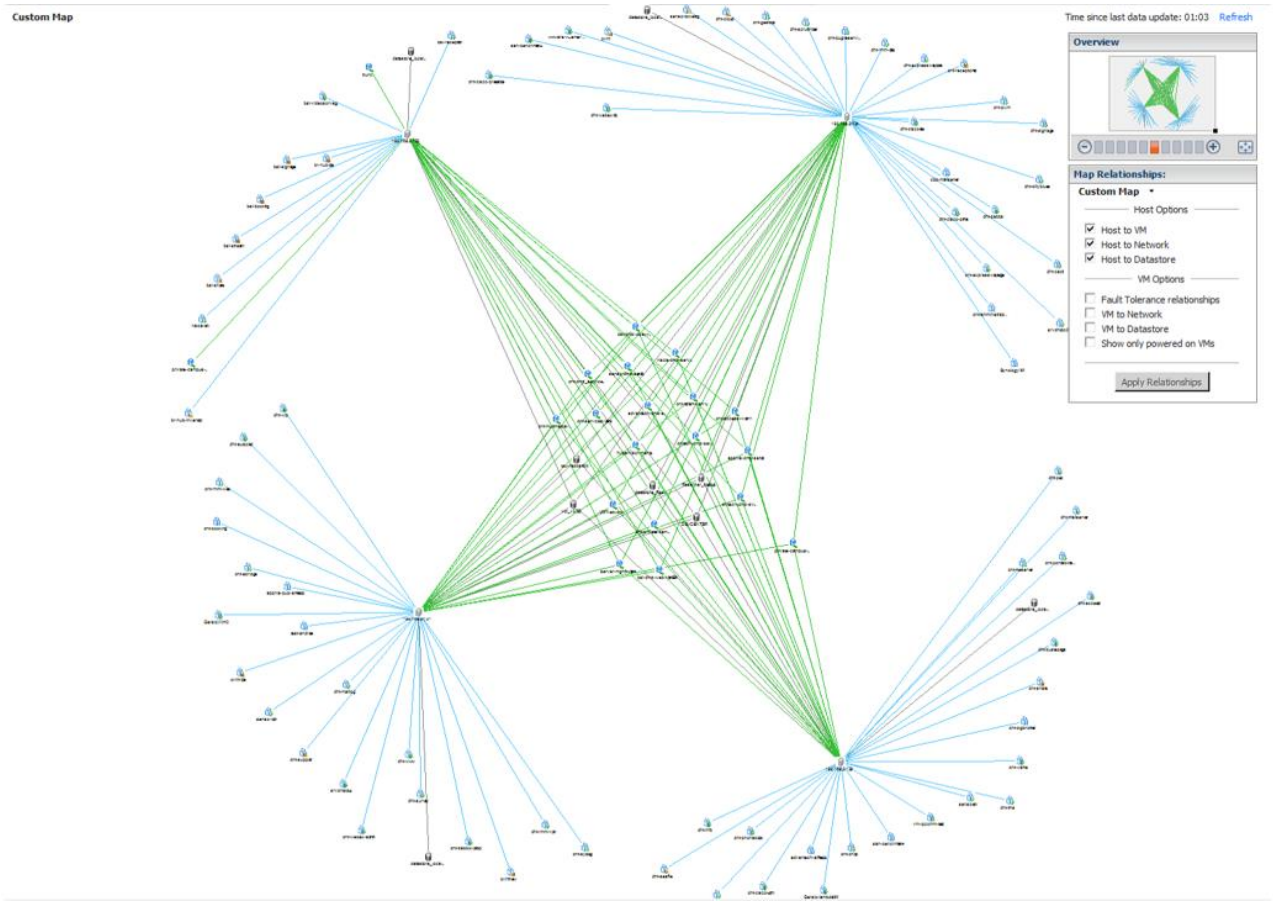

Figure 12 Map of infrastructure's relationship

7.4 Network & Security Infrastructure

DHITECH also offers a network service to the numerous companies housed in the building. The network & security infrastructure has been designed to achieve the right compromise between security and performance requirements. All the infrastructure, conceived according to the Software Defined Network (SDN) paradigm, is based on CISCO technology, on which the IT staff boasts advanced and certified skills. The aim is to offer the sub-contractors a dedicated and isolated company network, ensuring its management and ensuring high security policies. Both wired and wireless networks are based on the BYOD paradigm, where each user can independently manage the devices that have access to their company network. The network infrastructure consists of 61 physical devices and 9 virtual servers that manage network services and monitoring.

The infrastructure has been designed to allow multiple connectivity to be managed, based on the (public or private) nature of the individual sub-borrower; the security policies have been adapted to the DHITECH and the sub-loaned companies' needs.

In fact, since its first access to the network, the user is recognized, profiled on his own reference network and the policies defined and orchestrated in a centralized manner are applied to the same.

Each sub-borrower has its own LAN for the clients, one of service, dedicated for example to printers or other network devices. In case there is the need to exhibit services outside for each company, it is possible to realize different DMZ, application development or services.

In the DHITECH network environment there are:

- 21 L2 switches that manage more than 1200 building user outlets;
- 2 Redundant Core Routers and 2 Redundant Routers;
- 2 Redundant firewalls in HA;
- 29 802.11n Access Points with Dual Band technology and driven by a Wireless Lan Controller;
- 104 Networks between dedicated and isolated LANs for each sub-loaned company, LAN for service management and LAN, point of interconnection between the various devices;
- 93 VLANs of type L2 and L3.

High security standards are also guaranteed through the definition of 81 security policies and 41 Access List, while perimeter security is guaranteed through the definition of 163 access rules and 119 NAT Rules defined on the 2 firewalls in HA.

Below, a logical scheme of the infrastructure:

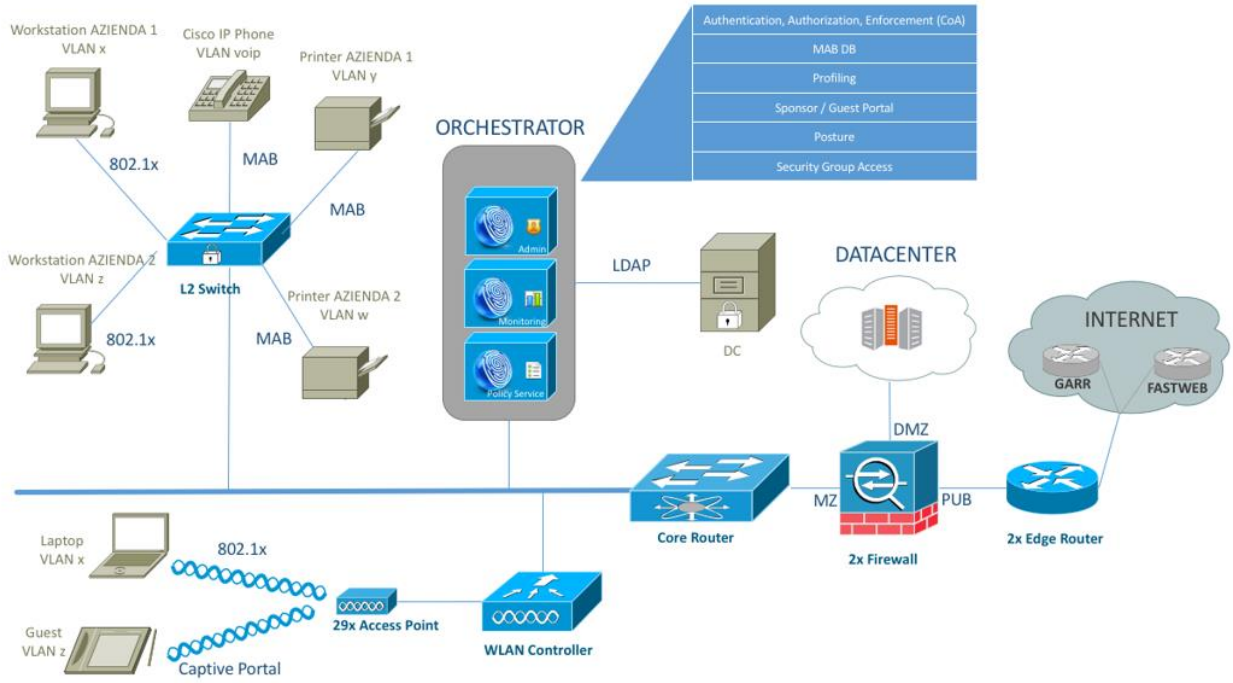

Figure 13 Infrastructure Scheme

The entire infrastructure is constantly and proactively monitored, through one customized monitoring system based on the UNIX platform.

7.5 Infrastructure of VoIP & conferencing

The DHITECH communication infrastructure, based on VoIP technology, was created in a multi-corporate environment according to the Unified Collaboration paradigms. The sizing of derivatives was carried out for each sub-borrower by evaluating the number of users of the same and guaranteeing the company's growth margin. 24 numbering blocks and 52 Translation Rules have been defined, the call manager has been

configured and the device pools, calling search space and all the rules that allow intercommunication between the devices of different sub-borrowers have been created and defined.

Profiles for virtual and physical telephone devices were created and subsequently all the telephone equipment purchased by Dhitech were profiled.

The call manager, based on Cisco technology, is able to meet the needs of each individual sub-borrower, in numbers:

- 1000 Directory Number, of which 197 to date active and used by sub-borrowers;
- 44 Device Pool;
- 26 Region, each profiled with codecs and ad hoc bitrates;
- 200 Calling Search Space to allow profiling of allowed calls;
- 198 Devices, of which 90 physical devices and 108 applications;

The Call Manager is handled completely by the IT staff, both from the system point of view and for every aspect of profiling a Directory Number, masking calling number and other policies. The switchboard is integrated with the centralized users on LDAP managed by the 2 Domain Controllers, also created by the IT staff. It has also been integrated with the certified reporting system, used to issue bills related to the use of telephone lines, the switchboard has been configured to allow the integration of some analogical equipment (typically Fax) in use by the various sub-stations. The Call Manager is also integrated with the web conference & collaborative learning system, also based on Cisco technology, and allows to manage the Call Conference and WEB Conference, used both for the Boards of Directors and the Shareholders' Meetings of the DHITECH, for the Meetings management of the various projects and at the same time by the sub-financial companies for internal meetings. The system can manage conferences up to a maximum of 50 users.

A Collaboration infrastructure was also built, also based on Cisco technology and integrated with the rest of the infrastructure, which allows, through the use of Codec and MCU, the integration of SIP/H.323 communications.

7.6 Services offered by DHITECH

All the infrastructures described above have been designed and implemented to provide the inalienable services offered to sub-borrowers and for the provision of some “core” services for the internal structure of the DHITECH. All the services are developed on heterogeneous systems (Unix operating environments of various types, Microsoft server operating environments etc.) and delivered on heterogeneous virtual platforms (VMWare vCenter, Microsoft Hyper V, oVirt Manager etc.).
For the provision of each service the following steps have been necessary:

- Design and sizing of the service;
- Creation and configuration of the VM hosting the service (VM sizing, positioning on a suitable network);
- Installation and tuning of the Operating System and environments, necessary for the implementation of the service (database, web server, smtp server, development languages, etc.);
- System hardening to ensure the security of the service and the integrity of the hosted data (traffic redirect on encrypted protocol, implementation of intranet/internet access policy etc.);
- Configuration of the environment and integration with the District user directory service to allow centralized user authentication;
- Graphic customization of the environment;
- Test of the service from all the sub-borrower networks;
- Design and testing of the most suitable backup system for the service provided;

- Deployment of the service.

7.6.1 List of Services

- Corporate Directory Service: this service deals with the management of the users of the district and of the sub-loaned companies. This service is distributed on 2 VMs in High Availability and enables users the access to their own network and other services provided. It also performs the following roles: Domain Name System (DNS and Reverse DNS), Certification Authority, Group Policy Orchestrator. The same was organized to reflect the multi-corporate nature of DHITECH, and 526 Users have been defined on it, since 2014, among which 291 are active.
- Corporate Phonebook Service: this service collects the telephone numbers of the users of the District and allows the various companies their visualisation, through predefined privacy policies.
- User Management Service: this service allows the user to manage the password for accessing the services and to set up customized security questions for the recovery of the same.
- Video Surveillance Service: this service manages the cameras installed by the IT staff inside the structure. The service has been designed to operate independently outside the working hours. This service has been instructed to record events from the cameras in case of Motion Detection on appropriately configured activation zones. The implementation of this service required, in addition to the phases described above, the installation of the cameras inside the structure, their calibration and the granular definition of the activation zones of the system. It is composed of 4 cameras interfaced via network to a DVR based on an open source software that manages 12 zones of recording activation.
- Access Control Service: this service allows the management of RFID readers installed outside the structure and in some areas of the district. This service deals with managing the access-enabled users, through granular profiling, and the time slots in which access is allowed or denied. The building has been equipped with 10 Controllers, able to manage 2 gates separately, and 18 RFID readers. The same are controlled and managed through a software platform implemented by the IT staff, on which 26 access groups have been defined, 9 time slots, and 306 badge profiles. Each badge is also personalized with the logo of the sub-loaned company that requires it.
- Telephone Reporting Service: this service produces telephone bills for individual companies. For its provision of this service it was necessary the integration with the Call Manager for the extrapolation and translation of the raw data generated by the same and, at the same time, integration with the corporate directory service for the assignment of calls made to the relevant company. In addition, the system was instructed to comply with the pricing convention used (currently the Consip LAN 4).
- PEC and INFO Management Service: these services allow the exclusive access to DHITECH employees, designated to the institutional e-mail accounts (info@dhitech.it and dhitech@registerpec.it), a dedicated VM has been created and the account so that access to the boxes is exclusive.
- Payroll Processing Service: this service allows DHITECH employees to split the file sent by the job consultant and generate individual personal coupons. The service also deals with automating the sending of the same to employees via e-mail, through the institutional address.

- Visitor Management Service (currently abandoned due to absence of concierge service): this service allows the digital registration of visitors to the structure by providing a report of the same.
- Infopanel service: this system allows the visualization of information contents on the companies hosted by the building and on their location, through the monitors set inside the hall and near the lifts. The system manages the automation in switching the monitor on and off.
- Fileserver Backup Service: this system allows the correct backup of the data hosted on the company fileserver. It allows to keep a backup copy of all the contents of the fileserver on a secondary SAN, with a 7-day retention in incremental mode. The system allows to contain the wear of the SAN disks by transferring only the files that are modified compared to the previous day, and keeping 7 copies

of the same. The system operates at night, so as not to impact on the performance of the infrastructure.

- Company Mail Server: this service deals with sending and receiving emails for the district and for the projects hosted at the same. Today it hosts 8 Domains and 152 Mailboxes.
- Corporate File Server: this is the District centralized repository, which all the administrative data, personal home and company shares reside on. This service has required the implementation of a very sophisticated backup and disaster recovery system, to optimize data traffic, in order to safeguard the wear of the storage units and at the same time guarantee the maximum protection of the hosted data. This operation, lasting one week for the test and an additional 4 days for optimization, was performed at night to protect the business-continuity and be completely transparent to colleagues.
- Corporate Web Server: it is the service that hosts the institutional site and the sites of the projects in which the District is involved. Maximum attention is paid to ensure the security of the same and avoid attacks from outside that could compromise the integrity of the hosted sites. This service currently hosts 14 WEB sites.
- Software Defined Network service: this system deals with the orchestration of users and devices connected to the District network. It allows the management of the infrastructure, through the BYOD paradigm and the management of access to the network by the guest users. It is the core system of the district's networking infrastructure and allows the profiling of the security policies of each individual company. The system also exposes the portals used by the sub-loaned companies for the autonomous management of personal devices connected to the network and for the autonomous creation of guest network users by the representatives appointed by the companies.
- DHCP service: This service deals with the assignment of IP addresses in a dynamic and static, according to rules set for each individual company.
- Telephone Switchboard Service: this system manages the VoIP telephone infrastructure of the district and the sub-loaned companies. It is a complex system that allows the partitioning of the derivatives assigned to the district and their interconnection, and pressed the orchestration of all the numbers and telephone sets. This service allows to establish the policies of each individual company on outgoing and incoming calls in a granular manner.
- Webconference service: this system enables the hosting of video conferences and web conferences. Through this service, it is possible to set up an audio-video conference either by browser or by telephone or dedicated equipment.
- Maintenance and Monitoring Services: this set of services is necessary for the correct management and maintenance of the infrastructure (Monitoring Data Center, Monitoring Server, Monitoring Storage, Monitoring Network, Syslog, Network Analyzer, etc.).
- Virtual Environment Backup Service: this system deals with keeping N copies of the VMs hosted on the virtual infrastructure. These VMs host all the services exposed to the District and to the sub-loaned companies. Retention policies have been established and implemented, based on the importance of the service exposed by the VM. The system operates at night time, so as not to impact on the performance of the infrastructure.
- EBridge Buffetti platform service: this system allows the use of the new accounting platform. The implementation of this platform required constant interfacing with Buffetti's technical staff, to establish security and backup policies, and produce the best performing platform to host their accounting software.

7.6.2 Skills

Given the complexity of the technological infrastructure, the Dhitech management requires ICT and management skills, specifically:

7.6.2.1 Building management

- Design, drafting and revision of technical specifications regarding technological equipment
- Administration support for procedures for the purchase of new goods and services.
- Definition and implementation of user management policies
- CAD design and planning for the preparation of new environments
- Planning and management of maintenance interventions (on building and on IT infrastructure)

7.6.2.2 Management of IT infrastructure and IT resources

- Analysis of the state of the art of IT infrastructures, through technology partners.
- Innovation of technology infrastructure and future scenarios.
- Planning of IT group activities.
- Selection, assessment, training and coordination of IT staff

7.6.2.3 Data Center Management

- Design, maintenance and technology innovation of the data center
- Infrastructure consolidation, according to high availability standards
- Design, implementation and management of virtualized platforms and systems

7.6.2.4 Network and security infrastructure management

- Design of complex wired and wireless network infrastructures (BYOD, SDN)
- Configuration and management of active networking equipment in multi-corporate environments
- Definition and implementation of perimeter security policies and data protection

7.6.2.5 Storage and Backup Systems

- Design and implementation of storage systems
- Data allocation and provisioning
- Implementation of data access policies
- Definition of backup and disaster recovery strategies for physical and virtual environments

7.6.2.6 Video-communication infrastructure

- Design and implementation of the collaboration, web conference and multi-conference infrastructure
- Management of the communication infrastructure

7.6.2.7 VoIP infrastructure

- Design, implementation and management (profiling and sizing) of VoIP infrastructures in multi-corporate environments.

7.6.2.8 Management of systems and support platforms

- Architecture and operation Knowledge of the main Server Operating Systems (Linux, Windows and similar)
- Knowledge of scripting languages (Bash, Windows PowerShell, Python, JavaScript, etc.)
- Research, evaluation and implementation of support platforms for company activities

7.6.2.9 Systems Management for DHITECH Services

- Design and implementation of heterogeneous computing environments and allocation of services on HA systems
- Deploying user authentication and orchestration platforms
- Implementation of video surveillance services based on motion detection system

7.6.2.10 Monitoring systems

- Monitoring and alerting systems for Data Center Infrastructures
- Design of monitoring platforms for complex infrastructures, allocation of physical, virtual and storage computing resources
- Definition of monitoring policy on calculation systems, electrical distribution, network & service availability, intrusion detection.

7.6.2.11 Help Desk

- Problem solving and technical-IT consulting
- Study and resolution of problems concerning the services exposed
- Design and support for the deployment of software platforms, necessary for projects
- Assembly and management of, workstations, servers and PC hardware and software

Below, the skills closely related to the Staff ICT world are summarised:

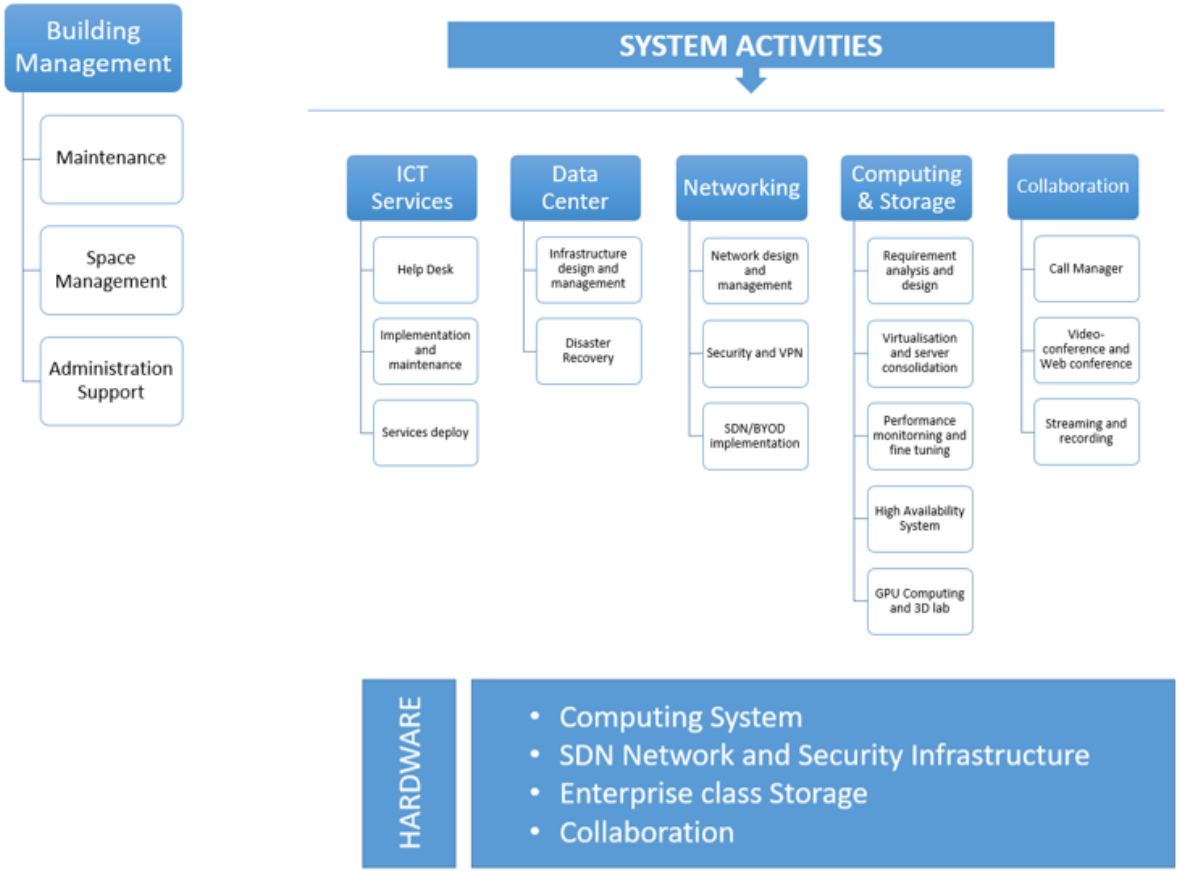

Figure 14 IT Staff skills

SECTION 2
THE ALBANIAN INCUBATOR FOR AN EFFECTIVE INTERREGIONAL ECOSYSTEM

According to the context analysis made by the Albanian and Montenegrin Partners in AT1.1, the Dhitech identified the characteristics of the interested area, focusing on general territorial aspects, population and migration, social and cultural environment, technological and digital development. Then, it made a deep market analysis, focusing on the main challenges and barriers that the SMEs and start-ups have to face. The aim is to suggest to the Albanian and also Montenegrin Partners how to export the successful DHITECH model in their territory. In this way, it will be possible to create an effective interregional ecosystem, creating a incubators and technology districts effective network.

8 Albania

After many structural reforms, Albania was one of the countries with the fastest growing rate, in fact, despite its dismal initial conditions, this country became one of the best performers in terms of macroeconomic performance. The country`s economy has improved markedly over the last decade due to the reforms in infrastructure development, tax collection, property law, and business administration which are still progressing. Nevertheless, Albania is still one of the poorest countries in Europe, according to major income indicators. (1)

This country has a significant potential for economic growth and development, because it is located in the Western Balkan Peninsula: its geographical position is perfect for a quick access to the markets of Italy and Greece, as well as overland into other European Union countries. It is also a crucial transport hub, with Durres and Vlora ports linking up to the regional road corridor networks and enabling access to the sea to other landlocked Balkan countries.

Albania’s favourable climate and abundance of natural resources offers development opportunities in sectors such as energy, mining, agriculture and tourism.

The country offers a professional and skilled labour force with an average salary of around EUR 300 per month: this enable investors to consider Albania as a viable option for the manufacture, production and processing of goods and services. (2)

Albania's population reaches 4.2 million, but, in the period after the fall of the communist regime, is recorded a significant decrease in the growth of the population because of Migration and also because of the decrease of the number of births. The primary cause of migration since '90s remains the desire to ensure a future life. Despite the numerous resources Albania has, they remain useless, so people want to go in other countries to find a job. (3)Also an important social problem for the Albanian population which migrates abroad remains their "Social Integration" in these countries. The work, in which they are employed, affects their social status. Most Albanian immigrants in Greece and Italy work in the construction sector, agriculture(men) and home services (women). Employment in these sectors acts more like a survival factor rather than a factor of integration, civilization and emancipation. (4)

The city with the biggest population of the country is represented by Tirana that it seems to be the most populated prefecture in the country (31.3%) followed by Fier (10.3%) and Durrës (10.1%). Regarding the other prefectures, 5 of them occupies only 2 % to 5 % of total population. (5)

For this reason, the Incubator for digitalization will be developed in the city of Tirana, geographical and economic centre, meeting point for all territorial enterprises and start-ups.

Referring to the social and cultural environment, consumers start to need new services and products, more in line with the new market trends. This aspect depends also on the purchasing power and consumption patterns related to disposable income, employment and unemployment indicators.

Salary and pension level is among the lowest in the region. Given that Albanian society is characterized by a population with average and below average income, the large part of personal income is used for purchasing utility products, limiting the development of new products and services in the domestic market. Albania is a new country in the field of information and technological development, there is a significant improvement in investment for technological environment. The major developments and the undertaken reforms by the government in the field of information technology, take the country to gain more positions in ICT rankings World Economic Forum. (1) Doing business electronically is a form of the contemporary business organization, which means intensive use of information, particularly Internet technology, for the implementation of all key business functions. However, environmental factors have affected technological awareness of companies in Albania, to use new services that facilitate contacts and business worldwide. (4)

For these reasons,it is absolutely important to invest in the digitalization of every kind of services.

8.1 SMEs and Challenges

According to the IMF (International Monetary Fund), after numerous reforms, Albania is one of the countries with the fastest growth rate compared to other economies.

The most important contribution to the country's economic growth comes from the private sector, which continuously shows growing trends of market economy, not only in the traditional sectors, such as the services sector, but also in the manufacturing sector. Taking into account the private sector of the economy, most companies are small and medium enterprises, SMEs represent approximately:

- 99% of the total number of active companies operating in the national economy;
- 74% of registered jobs, at national level;
- 55% of sales (revenue) at national level;
- 70% of national GDP. (6)

The role of SMEs has become even more important because it provides employment and growth opportunities for regional and local communities. The highest concentration of SMEs is in the central area of the country, especially in Tirana: most are concentrated on the local market while small percentages are export-oriented. However, in recent years, the Albanian government has been implementing a wide range of structural reforms to strengthen the rule of law and to create an internationally competitive business environment. Among the reforms to improve entrepreneurship, there is the adoption of the Triple Helix-based action plan for cooperation between universities, industry and government, as well as the work for the creation incubators for start-ups. Furthermore, the Albanian Government is focusing on improving the quality of Vocational Education and Training (VET), introducing a series of tools to support SMEs to use ICT (Information and Communication Technologies) and innovative digital technologies; the strategy also aims to increase the willingness of SMEs to use ICT solutions. The goal is to link VET to the needs of the work market and to increase employment for women, young people and vulnerable groups, trying also to solve a significant social issue. (7)

The Albanian Investment Development Agency (AIDA) continues to implement the strategy for the "Enhancement of institutional capacities for research and innovation" to further support the development of research and higher education systems. The Government continues to facilitate international trade through the cooperation with other countries. The objective of this policy measure is to improve the regulatory and institutional framework for exporting SMEs. The Albanian business climate is becoming more

complicated, uncertain, and undefined where innovation, globalization and changing competitive approaches have important impact on the overall performance. Nowadays the capability to innovate is crucial in order to improve business indicators and to be competitive in global market. Today SMEs, especially start-ups, must keep up with their competitors, grow rapidly and know the best way to innovate through the right techniques and methodologies. (4)

8.2 The limitations of Albanian's SME in the strengthening of regional and international competitiveness

Although the SMEs sector plays an important role in the country's economy, their development in Albania is below the regional average. SMEs face with many challenges and obstacles during their daily operations to reach the desired levels of economic development and to become very competitive in the regional and global market. Among the main challenges for SMEs, there are the difficulties in finding financial resources, the loss of time to fill out the forms for each simple operation, the high interest rates offered by the bank, the lack of a functioning developed online service infrastructure. Infrastructure is another challenge, due to the damaged rail system, which would have been a good alternative and a more economical means of transport that SMEs could use. (4)

Most small companies suffer mainly from a series of disadvantages and specific market failures, including:

- Informal/unfair competition;
- Administrative court low performance;
- Difficult relation with local administration;
- Inappropriate road Infrastructure;
- Local tax unsuitable management;
- Frequent change of administration staff;
- Frequent changes of laws and procedures;
- Difficulties in awareness and understanding of legal provisions;
- Lack of well-defined working rules;
- Access to qualified work force;
- Frequent electrical power/energy black outs;
- Corruption;
- Difficulties in accessing to funding;
- Lack in Technological Development.

In Albania, the lack of innovation is an important aspect that determines the survival of SMEs on the market.

In fact, through the intelligent use of technology, SMEs can maximize their productivity and minimize costs. But there are many obstacles that prevent companies from increasing their development, such as: the budget, the lack of experience and knowledge in the technological field and the management of the huge quantity of company data.

For this reason, the use of technology would help many SMEs to improve their potential and consequently to increase Albanian economic development.

8.3 Competitors Analysis

In this section DHITECH analysed all the possible competitors for the project Albanian incubator.

For a company is important to know who the competitors are, what they offer on the market and under what conditions, how they promote their products, what are their strengths and weaknesses. The company must know these information to obtain strategic commercial information regarding the sector in which it operates. In the previous chapters we analysed the socio-economic situation, and from the data examined we can see that the unemployment rate, for various historical economic and social reasons, is always high.

Although the Albanian economy progresses year by year and the rate of economic growth is positive, the level of inflation is low. There is a strong annual growth in the export of products and a significant growth in tourism, but the problem of unemployment remains present.

For the Albanian Government solve this problem is a priority, therefore, the Government is trying to implement all the possible initiatives to increase population employment, also in collaboration with the International Institutions that work to reduce the level of unemployment. In this context, the role of the "Business Incubators" is valued both by the Albanian Government and by the International Institutions, especially if they are well-structured and they have the objective of increasing Albanian economy and reducing the problem of unemployment.

The Albanian State has launched two State Incubators: one in Tirana and one in Scutari and they are managed directly by State Organs.

These were set-up with World Bank assistance (Training Enterprise and Employment Fund) and are the responsibility of the Ministry of Labour and Social Affairs, rather than the institution responsible for enterprise development, namely the Ministry of Economy, Trade and Energy (METE).

- The subsidized services include office services such as:
- Office services (telephone, fax, receptionist);
- Training (start-your-own-business, improve-your-business, etc.); and
- Legal advice.

The Tirana business incubator was established with support of World Bank Training, Enterprise and Employment Fund in 1998 and it accommodates 20 companies engaged on various professional fronts.

Companies have the benefit of paying a low price for renting the premises.

Activities of the Tirana Business Incubator are as follows:

- Management of Business Incubator;
- Demise of Business Incubator environment for small business operations; and
- Support and finance among credit for different projects (e.g. Creating of new business, Training among participation in work, Incubator of small business).

Within the State Incubator, there is a director, two state managers and three directors who are paid without any precise definition of their respective duties and role; this method of remuneration inevitably creates problems.

The Business Incubator in Scutari is also in the same conditions. It was created in 1999 with support of the World Bank Training, Enterprise and Employment Fund too. The incubator was working upon the same rules as the Tirana Business Incubator. The subsidized services included office services such as telephone, fax, and reception, training and legal advice. (8)

Due to these organizational problems, the two state incubators cannot represent an example of efficiency and effectiveness to be exported to the rest of Albania.

Instead, private European business incubators play a different role, they can be an excellent starting point to offer new job opportunities to unemployed people. These incubators are more efficient because they provide incentives for those who manage them, so that the personnel who work there are more motivated. (9)

Furthermore, there are many initiatives to support research in the development of ICT sector and Digitalization, including:

- **Metropolitan Incubator**, an initiative of Metropolitan Tirana University, is an organization that aims to include young talent in the ICT field, construction, marketing, order planning, creation, development of new start-ups. (10)
- **AppKubator** was created to stimulate research in technology, and to push careers of students and young entrepreneurs.

  The place hosts laboratories and research centers, in order to encourage the creation of high-tech companies, it is useful to catalyze knowledge and implement projects, initiatives and companies. (11)
- **ProTIK ICT Resource Center** was created thanks to the combined efforts and objectives of the Government of Albania, USAID, the Albanian-American Development Foundation (AADF), Microsoft, Cisco and Albtelecom. Protik's mission is to favour the development of the information and communication technology (ICT) sector in Albania.

  Protik aims to become the Albanian ICT hub: a connection point for those looking for the latest and most innovative ideas, products and services. (12) It can rather be characterized as a service provider than a strategic incubator as it neither provides co-working space nor a regular incubation program. Besides the conduction of events for the start-up community, Protik's work is project-based, resulting in a broad mandate with no clear support focus. (51)
- **Albanian-American Development Foundation (AADF),** is responsible for encouraging young students and professionals to improve their business possibilities, through:
  - courses to improve digital capabilities;
  - courses for school managers, AADF will support school principals for at least 5 years so that they can get funds.
  - ICT development in pre-university education (14)
- The **Innovation HUB** Tirana project was developed by the Ministry of Innovation and Public Administration (MIAP) together with two important partners: the Barleti Institute for Research and Development (BIRD) and Partners Albania (PA), within the framework of the Italian-Albanian debt for Development Swap Program (IADSA) and been has been inaugurated in May 2016.

  The objective is to promote and support social inclusion and sustainable employment programs for young people by improving their active involvement both in ICT entrepreneurship and in creative, innovative and competitive actions through building capability, partnership development and the growth of entrepreneurial activities, start-ups and SMEs. (15)A wide range of programs and activities aiming for capacity building, raising awareness and networking with potential partners in Albanian startup ecosystem and beyond borders have been developed. Its Vision will serve as

catalyst for startup companies whose technologies will be emanated from Albanian and Foreign innovative people. IHT's aim is to help innovative individuals and others to bring research discoveries to the marketplace, creating additional jobs. While their mission is to promote and support the social inclusion and sustainable employment programs for young people by enhancing their active involvement in ICT entrepreneurship, creative, innovative and competitive actions through capacity building, partnership development and growth of entrepreneurial activity, start-ups and SME. (48)

Main activities of the project: Restructuring the spaces for creating the adequate space (a business incubator) for new businesses, as well as for promoting the actions and activities intertwined with the innovative entrepreneurship (ICT); Establishing an incubator to offer access to the spaces equipped for young people who wish to become entrepreneurs and to offer free training/informing activities through: a Tech-Shop to offer training on security and the basic use of all the tools and equipment; one Hacker-Space; one Fabrication Lab that is a small-scale lab; - one Open Design City and one Hardware Lab. (49)

- Incubators, accelerators and co-working spaces form the cornerstones of a start-up ecosystem. With **Oficina** and **Yunus Social Business,** two organisations exist that cover the ideation, seed-stage and start-up phase. Yet, both organisations currently face challenges to secure long-term funding. While **Yunus Social Business** by its own words is pursuing a hybrid incubation and acceleration model, **Oficina** is run as a pure accelerator with a three months pre-acceleration program. **Yunus Social Business** being majorly associated with social enterprises realised after the first batch that a critical mass of start-ups at the identical stage would not be possible to accelerate. (51)
- Another program covering the ideation, seed-stage and start-up phase is the **GIZ-ProSeed / IDEA Program**, implemented by CEFE International and is currently funded by GIZ's ProSeed-Program, proving also funds for some startups. The program has been successful in carrying start-up support into universities and other support organisations. They also offer coaching and mentoring and are highly energetic to continue working with the method, which has shown good results among participants in the program because of its effective method and efficiency in delivery and support by increasing value, cooperation, emplacement and revenue. (51)
- **Barleti Hub – Business Incubator / Accelerator** is the center where young entrepreneurs with or without creative ideas are determined to succeed in the domestic and international market. Proper mentoring and expert guidance will have a significant impact on the personal and professional development of young entrepreneurs to increase the value of businesses by guiding them to move properly to the next level through providing experience, methodology, networking, support,

financing, buildings/spaces – needed to make an easier shift from a transition to a successful business.

They support new business startups to survive in the market during their first two-three years and grow sustainably by offering technical, academic and commercial assistance, through these phases: Shaping their idea, Training and New Skills, Business Model Canvas, Mentoring & Coaching, Commercialization & Prototyping, Toolbox and Services, Mapping Study, Franchise Model. (52)

- **Tirana Business Park (TBP)** is the largest German real estate, direct private investment in Albania. This unique multi-structure complex is the first large scale office project in the area of Albania, structured according to European standards. It wants offer the support of international teams of designer and engineers, its aim is the creation of a city for business within a city. For the moment this is only a well-designed project, not yet realized.
- **The Ivanaj Foundation's Business Incubation & Innovation Hub (BIIH)** offers a variety of services to support, train, and guide budding entrepreneurs who have the right idea, but lack the physical resources and/or know-how to carry their ideas from conception to successful established businesses. https://www.ivanaj-foundations.org/business-incubation-inovation-hub/

  The only organisation in the ecosystem, that partly targets the start-up phase but also the emerging growth and expansion phase, is the UK-Albania TechHub. (51)
-

Compared to these competitors, DHITECH suggests to the INTERRAnT Albanian Incubator to offer a more integrated system. The goal is to create a favourable environment for innovation in digitalisation and entrepreneurship, a network place, a meeting point between all the Albanian start-uppers, managers, entrepreneurs and qualified professional figures from all over the world that could inspire and motivate; with its, support Albanian companies can accelerate the transition to digitalization. Creating membership card, their customers will sign up for a subscription that allow them to use all services offered, in this way they will choose INERRAnT Albanian Incubator for every needs during the year.

8.4 PEST Analysis

PEST Analysis is an important technique useful to understand how the macro-environmental factors (Political, Economic, Social, Technological) could influence the company's business, and how they can interact, because they aren't single entities, but interdependent. (2)

PEST Analysis identifies all external variables that the company cannot control or modify, and that can indirectly influence it in both positive or negative way, the analysis is important to:

- Understand which environmental factors can affect the business now and in the future;
- Forecast behavioral factors, identifying opportunities and threats;
- Adapt business strategy basing on these factors.

POLITICAL FACTORS	After the political changes of 1990-1991, Albania starts economic and political changes in order to make a transaction from a centralized economy to an open market economy, and during this period critical social problems such as poverty, unemployment, individual insecurity, high prices and low wages were observed. Before 1990, over 55% of the population lived in rural areas, after this date, there has been considerable internal migration from rural to urban areas and from small village to larger cities. After 2000, the government invested in infrastructure, to better connect the main economic centres. An important aspect to take in consideration is that Albania is trying to enter in the UE, after 50 years of isolation and illegal immigration. Albania submitted its application for EU membership on 24 April 2009. The young Albanians are basically dreaming of accession, eager to live the European way of life, to fully exploit the possibilities for study and work guaranteed by EU membership and have the chance to get closer to the well-being of Western Europe. It is the Union itself that needs Albania and all the Western Balkans. Making those countries fully European is necessary for Europe for security reasons and to remove them from nearby, mainly Russian, influences. After the successful admission of NATO and the application for EU membership, now Albania benefits from the provisions on free movement of people (exemption from visa requirement) within the Union. On 1 January 2008, Albania signed the “Visa Facilitation Agreement” from the European Commission. This agreement consisted of facilitating the conditions for obtaining visas. The decision allows Albanian citizens to enter the Schengen States without a visa was a great achievement for Albania. (15) Opening borders and free movement facilitates the entrepreneurial environment in the country and is a key factor in increasing foreign direct investment. One of the Albanian government's initiatives to promote investment in the country is "Albania, 1 euro", the purpose of this initiative is to invite and encourage national and foreign

	companies to invest in this country, allowing for improvement of all indicators of the national economy.
ECONOMIC FACTORS	Following the changes and the transition in the early 1990s, a series of economic reforms were adopted in Albania to improve the country's economic situation. However, during this long period, the absence of market mechanisms and the lack of competition have made the Albanian market hostile to any form of innovation and economic growth. (6) After the first chaotic years, the country's economy began to stabilize and to show itself predisposed to improve and increase its economic situation. (1) Albania has shown a growing interest in the world economy by becoming part of the most important international organizations (UN, NATO and OSCE). Over the last decade Albania has made significant progress towards a modern market economy and has excellent potential for development. The proximity to Italy represents a strong point for the development of economic and commercial relations with our country, which is confirmed as the first trading partner of Albania and first investor for number of companies. Albania not only offers many investment opportunities (low labour costs and low prices for properties) but also offers a great potential market for European countries. It should be emphasized that Albania has joined the free trade agreements with the Balkan countries, increasing trade opportunities with the Region. According to the 2019 analysis reported by the IMF (International Monetary Fund), after undertaking many structural reforms, Albania was one of the countries with the fastest growth rate compared to other economies in transition. Despite the poor initial conditions, Albania has become one of the best performances in terms of macroeconomic performance, with a growth in GDP per capita over the period 1992-2004 of over 6% per year. (5)
SOCIO-CULTURAL FACTORS	Albania is a country characterized by a collective society cantered on values, beliefs and traditions. It's very important to understand how social and cultural factors influence economic development while influencing the growth and emergence of new industries and businesses.

	For demographers, a widespread phenomenon is the impact that political and economic changes have on the social and demographic behaviour of the population. For this reason, companies have a great interest in analyzing the connection between market trends in relation to social and cultural changes, to improve and increase economic growth.
TECHNOLOGICAL FACTORS	Albania is a new entry in the sector of technological development. In fact, in recent years there has been a significant improvement of investments made for the technological environment. Thanks to the developments and reforms undertaken by the government in information and communication technology, Albania has acquired better positions in the ICT rankings of the Word Economic Forum. Albania, like Europe and the world, is embracing this digital revolution by creating new opportunities for citizens and business to benefit. In this context, the Government of Albanian has taken a strong commitment towards supporting and promoting digital initiatives as a powerful tool that leads to modernized governance, increased know-how for a society that is more open, and a sustainable economic development for its citizens. Albania already possesses powerful instruments to develop the digital market and e-services, including full coverage of the population with mobile phones and secure identity cards, as well as a state consolidated and interactive digital infrastructure. Population makes intensive use of mobile phones on the basis of a solid 3G-infrastructure, with the 4G service coverage having just started to spread. The secure identity cards provided to the Albanian citizens enable electronic identification and qualified electronic signatures that will help both the public and private sector develop reduced in time and cost-effective, services and processes. Technology represents the future of world economic development to ensure good governance and create development opportunities for the next generation.

8.5 SWOT Analysis

The DHITECH preliminary work was finalized to identify the Strengths, Weaknesses, Opportunities, Threats related to Albanian and Montenegrin context, in order to highlight an improvement strategy. For this final goal it is used a strategic planning technique: the SWOT Analysis.

It is intended to specify the objectives of the business venture or project and identify the internal and external factors that are favourable and averse to achieve those objectives.

- Strengths: territorial characteristics can give an advantage over others.
- Weaknesses: territorial characteristics cause disadvantage compared to others.
- Opportunities: elements in the environment that the incubator could exploit to its advantage in the interested area.
- Threats: elements in the environment that could cause troubles for the incubator work.

In order to structure SWOT Analysis, DHITECH relies on all the aspects previously analysed, integrated with more information.

STRENGTHS	• Candidacy for EU membership; • Abatement of barriers in entry; • Mineral and hydroelectric potential; • Development opportunities in agriculture, infrastructure and tourism; • Coastline with several ports; • Inexpensive and abundant work force; • Strength of the “Lek” against the euro (1lek= 0,0082€); • Regional economic integration; • Bilateral and multilateral agreements; • Ongoing reform in the educational system; • Ongoing reform in infrastructure sector; • Ongoing reform in tax administration; • Ongoing reform in ICT and digital field; • Increase of foreign direct investments; • Abatement of barriers in administrative procedures.

WEAKNESSES	• Much non-legal work; • Poverty; • Low priority given to education; • Ineffective court and administrative system; • High unemployment; • Inadequate procedures to cross borders; • Corruption and organised crime, in some cases linked to drug trafficker; • Small domestic market; • Low per capita income; • Poor infrastructure; • Outdated industrial technology; • Difficult access to finance; • Inefficiency of enterprise system; • Rising inflation; • Non-use of digitalization; • Lack of appropriate digital knowledge; • Lack of appropriate business knowledge; • Low capabilities to innovate.
OPPORTUNITIES	• Implementation of a new strategy for the improvement of SMEs competitiveness via transfer of technologies and innovation; • Implementation of incubators for the digitalization of services; • Government commitment in further improve the business climate; • Empowerment of business associations according to the sectors and increase in cooperation between industries and SMEs; • Availability of clean energy, and renewable resources; • Fast economic growth; • Low-cost skilled labour; • Strong work-culture; • Mineral resources endowment; • Natural and tourist attractions; • Investment permissive legal environment; (17)

	• Positive climate for investors; (18) • Strategical position for regional and European markets; • Access to Adriatic and Mediterranean seas; • Electronic Governance: online customs service, online procurements, online taxes services.
THREATS	• Unfair commercial practice; • Frequent changes in the tax legislation; • Lack of qualified human resources, especially among youth; • Restricted work opportunities for women and girls; • Low number of women in leadership positions; • Competition with neighbouring countries; • Competition with other incubators; • Informal economy; • Political instability; • Juridical instability; • Inefficient tax administration; • Corruption; • Property tax.

9 Albanian Incubator: DHITECH advices

9.1 Introduction about Incubators

The term "Business Incubator" identifies various programs or initiatives, promoted by public or private institutions, whose purpose is to promote and support the development of new forms of business.

According to the definition given by the **European Commission**, *"a business incubator is an organization that accelerates and makes systematic the process of creating new businesses by providing them a wide range of integrated support services that include workspaces, services needed for business development and integration and networking opportunities "*.

Incubators feed emerging businesses, helping them to survive and grow during the start-up phase, providing them a variety of services, equipment and resources necessary to create and support companies.

Therefore, it represents the place where an entrepreneurial idea, still in its initial phase, is supported and addressed to a market of potential financiers, so it can become an enterprise thanks to the availability of resources, services and expert advice.

The **American National Business Incubation Association (NBIA)** emphasizes that "*the main objective of a business incubator is to produce successful businesses that become independent and self- sufficient. These incubator graduates have the potential to create jobs, revitalize neighbourhoods, commercialize new technologies and strengthen local and national economies".* (19)

Within a business incubator, professionals with skills in business strategy, marketing and finance work, analyse the idea, evaluate the economic possibilities, the chances of success on the market and quantify the resources needed to give life to the project. They guarantee, for future entrepreneurs, assistance in managing activities, strategies and business and they select potential financiers by providing them access to possible funding.

The business incubator, therefore, allows a start-up to accelerate the development of new businesses, and its role is to refine the idea and make it more appealing for investors.

Given the great variety of existing incubators, *Aernoudt* tries to sort and define the different types based on their properties:

- **PUBLIC INCUBATORS**: they offer space and infrastructure services, technical skills and assistance for business development, in order to reduce costs of commercial activities.

Their main source of profit is the fees for the services they provide and the public financing from local, national and international schemes.

- **PRIVATE INCUBATORS**: they make their profits from tariffs on services and from a percentage of the revenues of incubated companies. In fact, their purpose is to create new initiatives by obtaining a portion of the new company.
- **HYBRID FORMS**: consisting of a temporary collaboration between public and private companies. (20)

9.2 Incubator for Digitalization and ICT Development

All the studies have shown that in Albania, there is a significant lack in ICT and digitalization.
The Albanian government, in cooperation with other states of the European Union, is encouraging the digital growth of the local economy, with the final aim to enter in the EU.
These initiatives include the adoption of electronic identity cards, the spread of the 4G network, and a series of initiatives to encourage young people to develop innovative ideas.
Among the strategic objectives of the Digital Agenda of Albania 2020, as regards SMEs, the government wants to innovate and develop through ICT all the small and medium enterprises, through the following activities:

- Support in innovation for companies;
- Stimulating people to use ICT instruments;
- Creation of incubators (in terms of physical space and development of these services for business support, scientific research and innovation in ICT sector) with the aim at creating a more favourable environment for the development of new business ideas, creating new businesses, jobs and added value through the healthy growth of these companies;
- Support in ICT for companies with cooperative platforms, which can also facilitate and support strategic cooperation between them and other organizations in order to increase the value chain for ICT products and services, favouring globalization and access to new markets;
- Strengthening and support for start-ups in digital and online services, as well as offering financial support alternatives, such as the ICT voucher for the innovation scheme. (21)

Taking in consideration all these objectives, Albania need of an Incubator that could give to enterprises the possibility to grow with specific learning paths in digital and technological field, making available new innovative devices and technologies, allowing at the digitalization of all services, and support local start-ups' development. This could align Albanian companies with the dynamics of European business, favour economic, technological and digital growth, and make companies more competitive in the global market.

Hopefully this tool will allow companies to grow in the field of Information and Communication Technologies, the digitalization could also lead the public administration to save money and time substituting paper with digital services, and it could lead companies to interact easier with public administration, customers and financing sources.

It has also to remind the concept of **"Industry 4.0",** as representing the digitalization of manufacturing. The '4.0' provides a historical context, positioning this new phase as the fourth transformation in production. The first industrial revolution was depicted by mechanization through water and steam power; the second saw the concept of mass production through electric power; and the third resulted in the rise of the computer and automation. Now we have the fourth breakup in manufacturing – the creation of truly smart factories with cyber-physical systems and communication across the Internet of Things, in four main point:

1. Digitalization and Connection of all actors in the Value Process;
2. Fusion of the Production with ICT;
3. Cyber-Physical Systems are intelligent, they connect industrial production and logistics units who are able to communicate together.

9.3 BUSINESS MODEL CANVAS

The **Business Model Canvas** is a simple framework that considers 4 main business areas: CUSTOMER, OFFER, INFRA STRUCTURE, FINANCIAL VARIABILITY, and these 4 areas are deeply analysed in 9 basic blocks that show the logic of how a company intends to make money.

Going through these 9 blocks we could understand how the Incubator could fit all the strategic objectives of the Digital Agenda of Albania 2020, in the fields of ICT, Digitalization and Industry 4.0. (21)

9.4 CUSTOMER SEGMENTS

Customers are the heart of any business model, without them no company can survive for long.

The company must have a thorough understanding of all the features of its customers, including how they feel, how they think and act, in order to be able to group them into segments to best satisfy them and offer a clear value. A business model can define one or more customer segments according to the common needs, common behaviours or other attributes.

For the Albanian incubator, DHITECH suggests two main customers segments:

Users: People that use services that the incubator offers	**Sponsor:** People that want to collaborate and to take part in the incubator's activities.
• Existing Enterprises (in particular SMEs); • Start-ups and innovative ideas; • Students (graduated, not graduated, PhD students); • Institutions (private and public); • People interested in business and innovation.	• Investors: → Banks; → Business Angels; → Venture Capital (Companies want to invest in new projects); → Public Administration; → Private institutions.

9.5 CUSTOMER RELATIONSHIP

Customer Relationships define the type of relationships that the company establishes with its customers. This form of communication helps the company to acquire new customers and retain existing ones. The purpose in this case will be both to get in touch with new customers and to consolidate relationships.

It is therefore the marketing strategy that the incubator wants to undertake, in this case the relationships are almost the same for users and sponsors.

Users & Sponsor
• Social and Web Advertising; • Event Sponsoring (brochure, flyering, business card); • Information Meetings (brochure, flyering, business card); • Membership Card; • Collaboration with Enterprises.

9.6 CHANNELS

The Channels block represents the set of means by which the value proposition reaches the customer, in communication, distribution and sales phases. Channels are used to inform the potential customers about the services offered by the incubator.

Mainly due to the growth of the Internet, the concept of multi-channel strategies has acquired increasing interest in the field of marketing. With the use of multi-channel strategies, organizations increase their potentiality by reaching customers in different ways. In addition, customers can use the channel of their preference to get in touch with the company. As the relationships, also the channels are common for users and sponsor.

Users & Sponsor
• Social (Facebook, Instagram, Twitter, Banner); • Organized events and meetings in schools, companies, universities; • Organized events in the incubator office; • Participation in business events.

9.7 VALUE PROPOSITION

Value Proposition is the reason why customer segments turn to one company over another.

It solves a customer problem or meets customer needs. Each Value Proposition consists of a selected set of products and services that meet the requirements of a specific customer segment.

Some Value Propositions can be innovative and offer customers something revolutionary, a price reduction that leads to economic savings, or the improvement of a product's design and performance.

However, the customer is the real protagonist, with his well-being and the satisfaction of his functional, emotional and social needs.

The incubator offers different sets of services for users and sponsor, and it reserves special offers and prices for the incubator's certified members.

Users:	**Sponsor:**
• Learning path in technological and digital fields; • Learning path in entrepreneurship and innovation; • Learning path in business and management; • Making available hardware and software.	• Meetings with start-ups and entrepreneurs; • Usage of room for conferences

In particular for Enterprises and start-ups: • Meetings with investors and experts; • Rent of rooms and devices; • Usage of server room; • Benefits and special offers for members • Project Management and Business Modelling *In particular, for students:* • Summer start-up school; • Entrepreneurial school.	

9.8 REVENUE STREAMS

If customers are the heart of a business model, the revenue streams are its arteries.

A company has to wonder for what value each customer segment will really pay, and it has to generate one or more revenue streams from each customer segment.

The variables to be considered are prices (fixed or dynamic) and payment methods, fundamental aspects for making the business model sustainable.

Revenue flows can be generated by the sale of physical products, the payment of a fee for use, the sale of a license or brokerage fees.

In the following table, DHITECH tried to identify all the variables that will be the incubator's revenues (only from the users, because the investors will take part in our activities for free).

Users
• Training courses in technological and digital fields; • Training courses in entrepreneurship and innovation; • Training courses in business and management; *In particular for Enterprises and start-ups:* • Participation fee for meetings with investors and experts; • Rent of rooms and devices; • Usage of server room;

- Membership Card;
- Project Management and Business Modelling.

In particular for students:

- Participation fee for Summer start-up school;
- Participation fee for Entrepreneurial school.

9.9 KEY ACTIVITIES

Key activities are required in order to create, capture and deliver value and to operate successfully. Key activities can be divided into: productive, problem solving, maintenance or development.

For both Users & Sponsor
• Organization and Management of: → Training courses in technological and digital fields; → Training courses in entrepreneurship and innovation; → Training courses in business and management; → Summer start-up school; → Entrepreneurial school; → Events and meetings in schools, companies, universities; → Events in the incubator office; → Meeting events for investors and experts. • Participation in business events; • Management of Social and Web Advertising; • Event Sponsoring (brochure, flyering, business card); • Supply of Membership Card and related services; • Purchase and Making available hardware and software; • Writing Business Model and Project.

9.10 KEY RESOURCES

Key resources are the set of resources a company must have to make its business work. They enable organizations to create, acquire and deliver value to targeted customers and make profits. They can be: human resources (workforce), physical resources (points of sale, plants, machinery), intellectuals (software, user licenses, copyright) and financial resources (loans, credit lines, cash).

Key resources and key activities are interconnected and must be uniquely integrated to provide value for targeted customers.

Human • Director; • Project Managers; • Office Workers; • Server Specialists.	**Physical** • Computers; • Office Furniture (desks, chairs, monitors, printers, digital whiteboard, etc.); • Hardware; • Projectors; • Rooms.
Intellectual • Software; • Software licences	**Financial** • Public Funding; • Credit lines.

9.11 KEY PARTENERSHIP

The Key Partners block represents the suppliers and partners with whom the company works to create value for customers. A company, in fact, is not a self-sufficient structure, but rather a system that acts within a broader context, supported by external actors. Making strategic alliances responds to the business needs of reducing costs, reducing risks of competition and acquiring particular resources and activities.

Among our partner there are the investors, that are both sponsors and partners, they will take part in the incubator's activities, and the incubator itself will be also the meeting point between investors and innovative ideas that need money to start their business.

- Public Administration;
- Private Institutions (cooperative, associations ecc..);

- Banks (Tirana Bank, Intesa San Paolo Albania, Credits Bank, National Commercial Bank, ecc..);
- Platforms for Crowdfunding;
- Business Angels;
- Venture Capitals;
- Public and Private Universities.

9.12 COST STRUCTURE

The Costs Structure block defines the most important costs sustained during operation in a particular business model.

The costs can be fixed or variable (staff, rent, goods purchases, energy utilities, advertising, etc.), they are computed after defining the key resources, key activities and key partnerships.

However, the central objective is to make sure that the revenue streams exceed the expenses: only in this way the project can be considered effectively sustainable.

In the specific case of the incubator, we have only fix costs.

- Rental fee;
- Devices (computer, projectors, monitors, printers, digital whiteboard, ecc…)
- Consumption fee (energy, water, light, drainage system, garbage);
- Salaries;
- Advertising;
- Marketing (participation at events and fairs);
- Events Organization with experts;
- Maintenance costs;
- Administrative costs (office furniture, software licences, fax, internet fee, membership costs);
- External services suppliers (lowers, accountants, consultants);
- Taxes.

10 Financial Plan Example

To make more concrete its suggestions, DHITECH hypotheses an example of Financial Plan for the Albanian Incubator. The Albanian Incubator should offer its customers a service rather than a product. For this reason, its revenues will not come from the sale of an asset. For the realization of the Incubator the perfection should be accessing to the public financing. Waiting for this financial source, it should be useful to invest € 30'000 of social capital, and initiate a loan from the bank for € 120'000. These sources will allow it to sustain expanses for the first year. DHITECH have reported the repayment of the loan in the following 4 years with an interest rate of 8%.

From the second year, there is a state funding of € 500,000, divided into 4 trances of €125,000.

The main costs are related to the purchase of the necessary equipment, such as computers, projectors and the server; thanks to them we can give as many users as possible the opportunity to work with us. In fact, we sustain the highest costs in the first year, and at the end of it a passive closure is recorded.

The work place will be located in Tirana, it is about 1000 square meters and includes 3 rooms dedicated to startups and 3 rooms for companies, a conference room, a meeting room and an office. In these rooms, workstations will be set up to allow startuppers and companies to work on digitization and ICT.

Incubator's revenues come from different services that the incubator will offer, especially from the design of Project and Business Plan. We have planned the start of all activities in the second year and we have estimated to be able to write about 20 projects and increase this value up to 30 projects for the fifth year of work.

DESIGN				
	YEAR II	YEAR III	YEAR IV	YEAR V
N. DESIGN				
- Writing	20	20	25	30
- Approval	5	7	10	15
REVENUE DESIGN				
- Writing (5%)	100.000 €	100.000 €	125.000 €	150.000 €
- Approval (7 %)	35.000 €	49.000 €	70.000 €	105.000 €

For this reason, four highly qualified Project Managers will be hired to manage all activities.

Another important activity is the implementation of many annual courses of Entrepreneurship, Business and Management.

Among the planned activities there are:

- Start-up Summer Schools: 4 classes for 20 participants;
- Entrepreneurship annual schools: 20 participants;
- Software Usage Schools;
- Conferences (every 3months) with experts: 100 participants.

People and companies could also join the incubator, in this way they can take advantages and discounts, they can become Member A and a Member B through the **Membership Card**, useful also to retain its clients. Member A can have discount of 30% on conferences, while Member B up to 15%. The incubator does not exclude other benefits to be included over the years. This initiative can increase customer loyalty and strengthen a territorial network necessary for the development and growth of the country.

Below there is a clear description of all the costs/outlays and the revenues/incomes related to this Financial Example:

OUTLAYS/COSTS						
COSTS	**YEAR I**	**YEAR II**	**YEAR III**	**YEAR IV**	**YEAR V**	
Rental fee	36.000 €	36.000 €	36.000 €	36.000 €	36.000 €	
Consumption fee	1.200 €	1.200 €	1.200 €	1.200 €	1.200 €	
Devices:						
- Laptops	18.000 €	0 €	0 €	0 €	0 €	
- Projectors	2.000 €	0 €	0 €	0 €	0 €	
- Furniture	40.000 €	0 €	0 €	0 €	0 €	
- Server	70.000 €	0 €	0 €	0 €	0 €	
- Maintenance Costs	2.000 €	2.000 €	2.000 €	2.000 €	2.000 €	
Server Management	3.000 €	3.000 €	3.000 €	3.000 €	3.000 €	
Salaries	74.400 €	74.400 €	74.400 €	74.400 €	74.400 €	
Conferences for Membership A	0 €	600 €	1.500 €	2.100 €	3.000 €	
Conferences for Membership B	0 €	750 €	1.050 €	1.500 €	2.250 €	
Return Loan	0 €	30.000 €	30.000 €	30.000 €	30.000 €	
Advertising	0 €	2.400 €	2.400 €	2.400 €	2.400 €	

Marketing	0 €	5.000 €	5.000 €	5.000 €	5.000 €	
Events with experts	0 €	5.000 €	5.000 €	5.000 €	5.000 €	
License's Purchase	1.000 €	1.000 €	1.000 €	1.000 €	1.000 €	
External Consultants	3.000 €	1.500 €	1.500 €	1.500 €	1.500 €	
Interests	1.920 €	1.920 €	1.920 €	1.920 €	1.920 €	TOTAL
TOTAL COSTS	**252.520 €**	**164.770 €**	**165.970 €**	**167.020 €**	**168.670 €**	**918.950 €**

INCOMES/REVENUES						
REVENUES	**YEAR I**	**YEAR II**	**YEAR III**	**YEAR IV**	**YEAR V**	
Founding	120.000 €	0 €	0 €	0 €	0 €	
Public Founding	0 €	125.000 €	125.000 €	125.000 €	125.000 €	
Social Capital	30.000 €	0 €	0 €	0 €	0 €	
Design:						
- Writing	0 €	100.000 €	100.000 €	125.000 €	150.000 €	
- Approval	0 €	35.000 €	49.000 €	70.000 €	105.000 €	
Events:						
- Startupper Summer School	0 €	32.000 €	32.000 €	32.000 €	32.000 €	
- Entrepreneurial School	0 €	30.000 €	30.000 €	30.000 €	30.000 €	
- Software usage	0 €	16.000 €	16.000 €	16.000 €	16.000 €	
- Conferences	0 €	80.000 €	80.000 €	80.000 €	80.000 €	
Members:						
- Members type A	0 €	1.000 €	1.500 €	2.500 €	3.500 €	

- Members type B	0 €	1.000 €	1.400 €	2.000 €	3.000 €	
Rooms Rental Fee						
- Companies	0 €	0 €	0 €	0 €	0 €	
- Startups	0 €	0 €	0 €	0 €	0 €	**TOTAL**
total revenues	**150.000 €**	**420.000 €**	**434.900 €**	**482.500 €**	**544.500 €**	**2.031.900 €**

Then, there is a prospectus of the net income across the five years:

	YEAR I	YEAR II	YEAR III	YEAR IV	YEAR V
REVENUES - COSTS	-102.520 €	152.710 €	421.640 €	737.120 €	1.112.950 €
INCOME TAXES	0 €	22.907 €	63.246 €	110.568 €	166.943 €
NET INCOME	-102.520 €	129.804 €	358.394 €	626.552 €	946.008 €

And, finally, there is a graph that represents total costs, total revenues and net income over the five years, in order to see where we reach the Break-even point: in the second month of the second year.

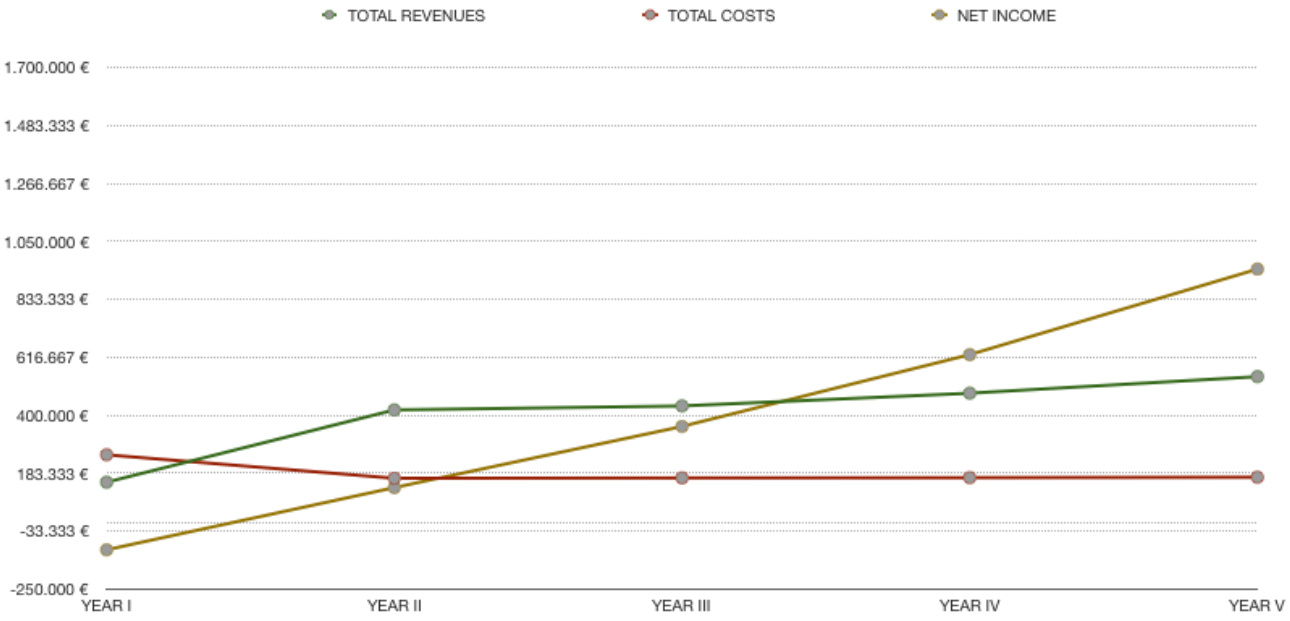

Figure 15 total costs, revenues and net income over five years

In the **Annex 1,** there are more detailed graphs for revenues, costs and net income year by year.

11 Follow-up

One possible development of the Incubator is the inclusion of new territories. After stabilizing revenues coming from Albania, the incubator will expand its reach towards Montenegro area, offering more services, and considering the possibility to open a new work place located in Montenegro.

Albanian Incubator could involve also Montenegro in order to give it the possibility to improve its economy exploit all the possibilities that new technologies can offer.

Montenegro area can offer significant opportunities to generate values, but it needs help to exploit all its possibilities in the best way; an Incubator for start-ups and territorial SMEs could support people to find the best way to present innovative ideas, have contacts with right investors, overcome many bureaucratic and organizational obstacles, and to have all necessary technological and digital new tools to realize innovative projects and to improve territorial economy.

11.1 Montenegro: Context Analysis

Montenegro is a small country with 640.000 inhabitants, it became independent in 2006. Montenegro's economy is concentrated in the sectors of Tourism, Agriculture and food industry, Construction, Trade, Maritime, Mining, Light industry, processing of aluminium and wood, Handicrafts. The market is based only on small and few medium enterprises: SMEs are most developed in the central and southern part of the country, while the north is less developed, in fact most people born in this part move to other countries in order to have more possibilities and a better future. In Montenegro, there is a part of poor population as a result of failed companies during the transformation of the system from communist to capitalist, due to failed privatizations. There are few small and medium-sized enterprises that have success in business, but the main problem is that the work market is not formal. Constitutionally declared as an ecological state, Montenegro has a special attention in the environmental protection and conservation; this is an important opportunity for economic growth, especially in this period, because sustainability and circular economy are becoming more and more important. . (2)

Despite this possibility, there are significant problems in the area of utility infrastructure such as its worn-out condition, high costs of capital investments, inadequate planning and financial resources. These problems make very difficult to be competitive in global market, and local self-government units are not able to solve them. The most important infrastructure projects are related to waste water treatment and water-supply.

An important physical infrastructure segment where Montenegro, as the neighbouring countries, is faced with significant problems is rural infrastructure, in rural areas the issues of local roads, water and electricity supply, sewage, water purification and waste management are more relevant than in other parts of the country. In order to ensure sustainability of public finances, enhancement of investment environment and competitiveness of Montenegrin economy, legislative framework has been modified to ensure higher budget revenues through the introduction of marked fees on retail fuel price, increase of health insurance contribution rate, introduction of tax on gains from games of chance and tax on coffee, increase of excise on cigarettes and excise on mineral oils as well as introduction of tax concessions for investments in the economic sectors more strategically important. In the context of strengthening the budgetary position of municipalities, tax debt has been rescheduled, guarantees for loan facilities has been issued and amendments to the Law on Tax on Immovable Property has been adopted, with the final objective of generating larger scale of immovable property tax revenues. These will have positive effect on the budgets of local self-governments and their liquidity. (4)

All sectors have a positive impact on the growth, especially construction and tourism; medium-term growth prospects of the region are positive, with an average annual growth rate of 2.7% in the period 2016-2017. Montenegro area can offer significant opportunities to generate values, but it needs help to exploit all its possibilities in the best way; an Incubator for start-ups and territorial SMEs could support people to find the best way to present innovative ideas, have contacts with right investors, overcome many bureaucratic and organizational obstacles, and to have all necessary technological and digital new tools to realize innovative projects and to improve territorial economy. (2)

SECTION 3
THE MONTENGRIN INCUBATOR FOR AN EFFECTIVE INTERREGIONAL ECOSYSTEM

12 Montenegro

Montenegro is small European country with 640.000 inhabitants (MONSTAT, 2011) which became independent in 2006. Since then Montenegrin government is fully committed to European and Euro-Atlantic integration of the country. As a result of these aspirations in 2017 Montenegro achieved one of the main

goals in the field of foreign policy and became the 29th member of the NATO alliance. (26) This membership ensured security of the country, improved business environment and strengthened stability in all region.

Montenegro is also very devoted to process of EU membership. So far, Montenegro has opened 30 and closed three negotiating chapters. This clearly brings country closer to the proclaimed goal of the country's 41st government to complete the negotiation process by the end of its term and prepare Montenegro for full membership of the European Union. On this path, the focus will continue to be on strengthening the rule of law and further strengthening the democratic capacities of the state and the society. (26)

Montenegro has a very favourable geographical position that provides opportunity for economic growth and development. Located in the Western Balkan Peninsula and surrounded by 5 countries by land (Croatia, Bosnia-Hercegovina, Serbia, Kosovo, Albania) and one by sea (Italy) country has a great potential to link Balkan counties with EU. Upon completion of construction work on highway (Bar-Boljare) it is expected that Montenegro will be very important transport route in this region of Balkan Peninsula. Highway will also contribute to intensive development of Port Bar, which is the main maritime connection of Montenegro with Italy and rest of the world.

Montenegrin's favourable climate and abundance of natural resources offers development opportunities in sectors such as energy, agriculture and tourism.

Compering with other EU countries, Montenegro has a professional and skilled labour force who is willing to work for a lower salary then in development countries. In 2019, average salary is 511€ but in the service sector (major employment sector: especially trade and accommodation and food service activities) average salary is around 350€. (27) This ratio between the quality of the workforce and the cost of labour force make Montenegro very attractive country for investors which is confirmed by numerous investments in the tourism sector like: Porto Montenegro, Porto Novi, Lustica Bay and others.

Montenegrin's population is very small, as already mentioned country has around 650 000 inhabitants. Like most of European countries Montenegro is also faced with intensive migration. Country has a problem not just with migrations out of country but also with migration inside of country, which leads to uneven regional development. People migrate from less developed northern part of the country to the central and southern part. Negative migration balance of municipalities from the northern part of the country is in increase. Unfortunately, official statistics does not provide information about migrations outside of the country and there is lack of research on this topic but through revision of official estimations of population in 2018 comparing with 2017, it is evident that some negative trends are present. According to Economic Reform Program, the main obstacle is in the field of labour market and employment due to insufficiently used human

potential. Insufficient work activity, mobility and motivation of the labour force are causing the significant employment of foreign labour, which together with informal labour shows as-yet-insufficient flexibility in the labour market. (26)

The city with the biggest population in Montenegro is capital Podgorica with population around 199 715 (MONSTAT, 2019) followed by Niksic 69 653 inhabitants, Bar 43 872 and Bijelo Polje 42 808 habitants. Montenegro is regionally divided into 3 regions. North region includes 13 municipalities and participates in the overall distribution of the population with 27%, central region includes 4 municipalities which contributes to overall population with 49% and south region with 6 municipalities and population contribution of 24%.

According to previous paragraph in which are explained interregional migrations inside Montenegro and negative population balance on the north side of the country, initial consideration is that Montenegrin Incubator for digitalization should be in north region. It is expected that in that case Incubator can contribute to the faster development of this region what can have a positive impact on reducing migration in this region. Also, one of the facts that support such considerations are that with completion of highway (Bar-Boljare) this region will be better linked with capital city and the most developed central region of the country. But further analysis shown that because of lack of human resources, lack of projects and initiatives in this region establishment of Incubator will be more expensive with high risk for survival. Because of these facts it is proposed that Incubator should be in capital Podgorica but that some of activities need to be organized in north and south region of the country in order to raise awareness of population about entrepreneurship and innovation and create new potential Incubator users.

Referring to the social and cultural environment, consumers require new services and products, more in line with the new market trends. This aspect depends also on the purchasing power and consumption patterns related to disposable income, employment and unemployment indicators.

Salary and pension level are among the highest in the region between non-European countries. (28) Montenegro belongs to the group of developing countries and according to *Doing Business report* is classified as the country with the upper middle income. These parameters characterize Montenegrin society and determinants they purchase needs and habits. The large part of personal income is used for purchasing utility products, limiting the development of new products and services in the domestic market. Even if Montenegro is a new country in the field of information and technological development there is a significant improvement in investment for technological environment. The major developments and the undertaken reforms by the government in the field of information technology, take the country to gain more positions in ICT rankings World Economic Forum. In 2017 Montenegro deteriorate position on ICT rang list and from 57 place fell on

61. (30) These are indicator that country is devoted to development of ICT but that we need to develop faster in order to be able to keep up with modern society and market ICT needs.

Devotion of Montenegrin government toward information technologies is reflected thought implementation of reforms in this field and introduction of e-Government service. These activities led to the rising awareness of advantages of using ICT in everyday life and business. As a result of that in Montenegro we have more ICT companies and more companies from other fields that are interested to invest in ICT sector.

For these reasons, it is important to invest in digitalization of every kind of services.

12.1 SMEs and Challenges

In recent years because of the construction of first highway in country, Montenegro increased it government debt including guarantees, which reached 79 percent of GDP in 2018.(31) Despite the very challenging situation for Montenegrin economy, International Monetary Fund (IMF) assessed the progress of Montenegro and welcomed the strong recent growth performance of the Montenegrin economy, bolstered by large investment projects and buoyant tourism, and took positive note of the significant fiscal adjustment since 2017.(31)

The most important contribution to the country's economic growth comes from the private sector, which continuously shows growing trends of market economy, not only in the traditional sectors, such as the trade sector, but also in accommodation and food service sector, construction and manufacturing industry. Taking into account the private sector of the economy, most companies are micro, small and medium enterprises. SMEs in Montenegro represent approximately:

- 99% of the total number of active companies operating in the national economy;
- 75.6% of registered jobs, at national level;
- 75.2% of sales (revenue) at national level;
- 70% of national GDP
- 56.7% contribution of SMEs in total investments. (32)

The role of SMEs has become very important because it provides employment and growth opportunities for regional and local communities and improves the conditions for starting new businesses. The highest concentration of SMEs is in the central area of the country, especially in capital Podgorica 35.9% of all SMEs are in this city. On the second place is Budva with 11.2% of SMEs and on third Bar with 9.9%. Talking about

size of the SMEs in Montenegro 90.5% are micro enterprise, 8.15% are small and 1.36% are medium-size enterprise.(32) However, in recent years, the Montenegrin government has been implementing a wide range of structural reforms to strengthen the rule of law and to create an internationally competitive business environment . The Montenegrin Government has dedicatedly worked to establish an institutional framework for supporting small and medium-sized enterprises. Ministry of Economy is key institution in charged for process of creating and implementing development policy in field of entrepreneurship and SMEs. Ministry of Economy established Directorate for Investments, Development of SMEs and EU funds management. Directorate is designed as a unique one-stop-shop for small and medium-sized enterprises and entrepreneurs to enable business entities to receive information and inputs about all incentive programs in one place, opportunities for business improvement and networking with other line institutions at the state and local level. (32)

Significant support for SMEs and entrepreneurship is provided by Fund for Investment Development, Employment Agency of Montenegro as well as through the programs of other competent ministries (e.g. Ministry of cience, Ministry of Agriculture and Rural Development, even Ministry of Culture). At the local level, except Entrepreneurship Development Secretariats in all municipalities, support for SMEs and entrepreneurs is provided by regional / local business centres, business incubators, innovation and entrepreneurship centres and other institutions.

Support for SMEs is also provided by business associations (Chamber of Commerce of Montenegro, Union of Employers of Montenegro, Montenegro Business Alliance, etc.), universities and international organizations. (32)

Montenegrin Government continues to facilitate international trade through the cooperation with other countries. In 2018, new Strategy for the Development of Micro, Small and Medium-sized Enterprises in Montenegro by 2022 is adopted. The objective is to improve the regulatory and institutional framework in order to improve the business environment, enhance the competitiveness of MSMEs, as well as specific target groups - young people, women and social entrepreneurship. (33) Similar to the Albania, business climate in Montenegro is becoming more competitive, though uncertain, and undefined where innovation, globalization and changing competitive approaches have important impact on the overall performance. Nowadays the capability to innovate is crucial in order to improve business indicators and to be competitive in global market. Today SMEs, especially start-ups, must keep up with their competitors, grow rapidly and know the best way to innovate through the right techniques and methodologies. (4)

12.2 The limitations of Montenegrin's SME in strengthening of regional and international competitiveness

Although the SMEs sector play an important role in the country's economy, its development in Montenegro in last report of World Economic Forum is rated as satisfactory but market size, macroeconomic stability, market sophistication and innovation are listed as problematic. (34) SMEs face with many challenges and obstacles in their daily operations to reach the desired levels of economic development and to become competitive in the regional and global market. Among the main challenges for SMEs are: the difficulties in finding financial resources, high fees for obtaining basic infrastructure for construction purposes, non-uniformity of fees by region, predictability of the business environment, unequal application of legal practices and still inconsistent procedures for issuing building permits by local government (due to the recent changes of the law) and the time waste to fill out the forms for each simple operation. Infrastructure is also one of the challenges reconstruction of railway system can scientifically improve conditions for SMEs development. The construction of the first highway in the country will have strong influence on SMEs opportunities and greater utilization of maritime traffic can improve environment for SMEs development.

As a main obstacle for SMEs development in Montenegro are identified:

- Lack of adequate infrastructure;
- Monopoly position of the notary's institute and the high price when registering real estate;
- Lack of specialized and trained workforce;
- Labour shortage in the Northern Region and frequent migration to the Central Region;
- Imports of specialized labour in the Southern region during the tourist season;
- Inability to market products and services;
- Insufficient visibility and recognition of products and services, as well as their competitiveness;
- Difficult tax settlement and lengthy procedures;
- Complicated tax returns - 300 hours per year to complete tax returns;
- Excessive number of VAT payments during the year;
- Dysfunction of conjoint collection of taxes and contributions in practice;
- Complete electronic registration of the company has not been introduced;

- Poor market liquidity, in view of the increasing number of blockchain businesses and the mere fact that it has become a practice “compensation” without or with minimal money involved in the exchange of goods.
- Long contract execution
- Corruption;
- Difficulties in accessing to funding;
- Lack in Technological Development. (32)

In Montenegro the lack of innovation, especially in the northern part of the country, is one of the crucial reasons for smaller number of SMEs and lack of successful business stories. Small market is already identified as main obstacle for SMEs development in Montenegro. Market on the northern part of the country is even smaller and currently less connected with central region then south region of country, which significantly linger survival of SMEs. Innovative SMEs can overcome small market obstacle and spread it business on other markets outside of Montenegrin borders and globally.

In fact, through the smart use of technology, SMEs can maximize their productivity and minimize costs. But there are many obstacles that prevent companies from increasing their development, such as: the budget, the lack of experience and knowledge in the technological field and the management of the huge quantity of company data.

For this reason, the use of technology would help many SMEs to improve their potential and consequently to increase Montenegrin economic development.

12.3 Competitors Analysis

In this section the possible competitors for the project Montenegrin incubator are analysed.

Competition analysis is very important in contemporary business. Awareness about key features related to the competitors are the main advantages in decision making process. Entrepreneurs and managers need to be updated with information about who the competitors are, what they offer on the market and under what conditions, how they promote their products, what are their strengths and weaknesses. The company must know this information to able to create competitive strategic documents for companies regarding the sector in which it operates. In one of the previous chapters we discuss situation in employment sector and stressed that the unemployment rate continued to decrease from 16% (2017) to 15.2% (2018) but remains well above the EU average. (2)

Montnegro is a small and open economy, service-oriented and largely focused on tourism as the principal source of income. Services account for nearly 80% of total exports, while foreign tourists alone generate over 20% of the country's GDP, but tourism potential is still far from being fully realised. (2) During previous yeras Montnegro faced with problems related to permanent and especillay seasonal labour force issues. Tourism and Trade sactor have strong influence on job creation and labour demand. As a key problem in employment sector are identifide following issues: weak job creation, skills mismatch, strict labour market regulation and relatively high labour taxation, undeclared work negatively affect employment, particularly among young people, women and the low skilled. (2)

For Montenegrin Government solving this problem is a priority. Government efforts are visible especially in field of education where structural reforms have been conducted, investments in R&D sector and support for SMEs and entrepreneurs. Investment in education has increased in recent years and accounts to around 4% of GDP, also the main government funding scheme for RDI significantly increased during 2018 and most of the new projects are now based on the principle of business co-financing. (2) Expect from the stated investment in education Goverment is continuisly working on improvment of bussines enviroment which is stimulative for start-up companies.

In collaboration with the international institutions government established four "Business Incubators" valued both by the Montenegrin Government and by the international institutions. In 2014 the first Innovation Entrepreneurial Centre "Tehnopolis" is opened in Niksic, Montenegro as a result of completed first phase of project for establishment of Science and Technology Park. Project is completely financed by Montenegrin Government.

Project is financed and managed by Ministry of Science and project partners are Municipality Niksic, Ministry of Agriculture and Rural Development and Fund for Investment and Development. The goals of the Tehnopolis are to create new jobs by applying new, advanced, innovative ideas and technologies with aim to create developed, learning and innovative oriented society. Services offered by "Tehnopolis" include:

- Infrastructural, technical, administrative and training support to new and existing entrepreneurs;
- Consulting services for new and existing entrepreneurs;
- Organisation of different courses for professional development and gaining practical skills;
- Promotion of "Tehnopolis" and entrepreneurship as a foundation for micro and small enterprises development;

- Networking of institutions, scientific research communities, foreign partners with regional and local economy;
- Office rental space subsidy;
- Transfer of knowledge and technologies;
- Business planning and development services;
- Presentation of tenants at fairs and expos;
- Networking of enterprises and connecting with incubators and Science and Technology Parks in the region;
- Free access to high-speed Internet;
- Using all available resources at Tehnopolis (data center, multimedia hall, meeting room, lounge bar, coworking space, additional common areas) under certain conditions;
- Presentation of tenants on Tehnopolis's website www.tehnopolis.me (35)

BSC Bar was founded in 2007 through the project of opening of business centers and incubators 2007-2010. The project was funded by the Ministry of Foreign Affairs of the Netherlands and implemented by Dutch NGO SPARK. In 2009, in order to achieve sustainability, the project management was transferred to local partners registered in the Foundation Business Start Center Bar. Seven institutions are recognized as founders of BSC Bar. In 2010, the BSC Bar opened Business incubator with aim to support the development of start-up businesses in the municipality of Bar. The incubator space is contributed by the Municipality of Bar and it is used for development of entrepreneurship. The current capacity of incubator is 34 working places for start up businesses, a conference room and 2 meeting rooms. (36) Services provided by BSC Bar include:

- Trainings
- Mentoring
- Networking
- Microloan support
- Business incubator services: subsidized use of office space-lower prices, lower overheads, use of complete common space of incubator, free registration, of the company, free consulting services and networking on B2B meetings.

Regional Business Center (RBC) Berane is established in March 2015 as part of the project "Establishment of a Regional Business Center with a Business Incubator in the Northeast of Montenegro", funded mainly by the European Union and implemented by the Municipality of Berane in partnership with the Regional Development Agency for Bjelasica, Komovi and Prokletije and the municipalities of Andrijevica, Bijelo Polje, Plav and Rozaje, which are also its founders. Even if is operative almost 4 years RBC still doesn't reach the expected performance. Lack of knowledge, innovative ideas and projects slowdown the center's desired development. The RBC is located in business zone "Rudeš", Berane in a reconstructed and equipped facility of almost 1000 m2 with: two offices, kitchenette with employee buffet, sanitary facilities for employees and parking.

Business space for rent containing: 30-seat meeting room, attic 260 m2 one hall of 100 m² (with the possibility of partitioning), one room of 75 m², two rooms of 50 m² and four rooms of 25m². (36)

"Tehnopolis" and BSC Bar represent two successful stories of state incubators in Montenegro. RBC is successfully implemented project but additional commitment of management is required in order to reach the full potential of the RBC. This is one of the reasons why it is suggested for RBC to host a Liveshow. It might be important to support management of the RBC in organization of big events, raise awareness of local people and expert public about entrepreneurship and possibilities for start up companies, innovative ideas, new jobs required and ultimately to promote RBC and entrepreneurship in general.

The youngest state or partially state founded incubator in Montenegro is **Business Incubator Cetinje** opened in 2017 founded by Municipality Cetinje and 4 private local enterprises. Incubator is managed by local authorities through Business Center Cetinje that provides free services to all Incubator tenants. Free services include information about potential sources of financing, support in administrative procedures and free preparation of business plans and other documents. The incubator has business premises - business units from 18 up to 24 square meters which are free of charge for beginners in the business during first period of business after which they are able to be use it at a discounted price. All business unit are equipped with high speed internet, telephone exchange and basic office equipment. The Business Incubator with the Innovation Center also offer to users' additional facilities such as: meeting room, multimedia room, ICT data centre, printing and copying services, reception, shared kitchen, parking and security, with a maximum residence time of five years.

Similar like RBC Berane Business incubator Cetinje is at the very beginning of its operations. Except to space rental services, the Centre's range of services is limited and not sufficiently competitive to meet all the needs

of modern business. Following years will be challenging for these two incubators but the expected upcoming demand will push incubators to be more competitive.

Except the incubators established with the Government support (both local and national) couple of private incubators and companies which invest in research and development of ICT sector and Digitalization, offer similar services, including:

- **Digitalizuj.me** is a digital community that seeks to help citizens and organizations in Montenegro to understand and take advantage of exciting new opportunities for social change and business in the digital environment. (38)
- **Domain.me** a private company which oversees Montenegro's national internet domain – .ME. The company organize conference Spark.me one of the key events from field of digitalization is country. Spark.me is one of the most carefully curated business/internet conferences in Southeast Europe. The conference has been organized annually since 2013, in the European country of Montenegro, as a part of the Corporate Social Responsibility program of Domain.ME (39)
- **M:tel Digital Factory is** a center for the development of technological entrepreneurship and innovation. Mtel Digital Factory offers the creators of a good IT idea the perfect conditions for setting up and developing their own businesses, so that they can start projects and grow a successful business as soon as possible. (40)

Compared to these competitors, DHITECH suggests to the INTERRAnT Montenegrin Incubator to offer a more integrated system linked on local and regional level and on institutional and enterprise level. The goal is to create a favourable environment for innovation in digitalisation and entrepreneurship, a network place, a meeting point between all the Montenegrin start-uppers, managers, entrepreneurs, and qualified professional figures from all over the world that could inspire and motivate young people and entrepreneurs. With its support Montenegrin companies can accelerate the transition to digitalization. Creating membership card, their customers will sign up for a subscription that allow them to use all services offered, in this way they will choose INERRAnT Montenegrin Incubator for every need during the year.

12.4 PEST Analysis

PEST Analysis is an important technique useful to understand how the macro-environmental factors (Political, Economic, Social, Technological) could influence the company's business, and how they can interact, because they aren't single entities on the market, but interdependent. (2)

PEST Analysis identifies all external variables that the company cannot control or modify, and that can indirectly influence it in both positive and negative way, the analysis is important to:

- Understand which environmental factors can affect the business now and in the future;
- Forecast behavioural factors, identifying opportunities and threats;
- Adapt business strategy basing on these factors.

POLITICAL FACTORS	Montenegro's international politics since independency is marked by two key events: NATO membership since June 5, 2017 and opening negotiations for EU membership. Montenegro is pro-European oriented country. The most important dates in its path to EU are: December 15, 2008, when Montenegro presents a formal application for EU membership, following the signing of the Stabilization and Association Agreement (SAA) in force since May 1, 2010 and the Interim Agreement in the field of trade, in force since 1 January 2008 and December 19, 2009, the date from which Montenegrin citizens can freely circulate in the 25 countries of the Schengen area, as well as in Iceland, Norway and Switzerland. Montenegro is a lead in EU negotiation process. Currently, from 33 negotiation chapters, 32 are opened and 3 are temporary closed. During the negotiation process Montenegro conducted numerus reform in different fields, improved policy and introduced European standard in the functioning of the public administration, justice, the fight against organized crime and the exercise of human rights against displaced persons and refugees. The EU's positive opinion on the degree of European integration allows Montenegro to officially obtain the status of candidate country on December 27, 2010. A year later, in December 2011, the Council of Europe starts the accession process still underway. On 6 February 2018, the new Enlargement document by Commission was presented (A credible enlargement perspective for and enhanced EU engagement with the Western Balkans), which sees Montenegro as the forerunner on the path to membership. (4)

ECONOMIC FACTORS	The priorities of the Montenegrin economic policy in the period from 2016 to 2018 are: further development of transport infrastructure, fiscal sustainability, improvement of investment climate, systematic reduction of informal employment, the creation of conditions for accessible and favourable loans which can support development of SMEs, the strengthening of the external position of the country and capacity building, which is also a common measure pervading the implementation of the seven objectives. These priorities are response to the obstacles to economic growth and are in line with EU recommendations for Montenegro. (4) Montenegro's economic growth is expected to decelerate. After recording several years of strong growth, the Economic Reform Programme (ERP) projects a reasonably cautious baseline scenario of moderation in public investment and consumption, which would dampen output growth to around 2.5% on average in 2019-2021. Lower domestic demand and the subsequent decline of import needs are projected to reduce the very large current account deficit, which is expected to remain financed to a large extent by foreign direct investment inflows. Financial sector indicators improved but the position of some smaller domestic banks remains difficult. The ERP's medium-term consolidation path is less ambitious than in last year's programme, but enough to ensure a relatively fast pace of debt reduction towards the fiscal rules' threshold of 60% of GDP. However, important reforms of the public sector and the pension system have been delayed or postponed, making it more difficult to restrain current expenditure. (2)
SOCIO-CULTURAL FACTORS	Despite the recovery trends the existing situation in the labour market of Montenegro is caused by the structural changes in the economic structure which crossed from the industry sector to the service sector, as well as the impact of the long-lasting economic crisis that ultimately affected the labour market. It is characterized by a relatively **slow increase in employment rate**, which was 45.9% for the population 15+ in the end of the third quarter of 2015 and caused a relatively low activity rate of 55.0% for the same population group. However, a key challenge in the labour market remains a structural mismatch between supply and demand in the labour market. As part of this challenge, it should be emphasized that this mismatch is most visible

	among youth, especially university graduate sand education. Montenegro government is actively working on **educational reform** in order to better align education and skills with labour market needs and to strengthen the cooperation between education and the economy. The issue **of lack of social inclusion, fight against poverty and insufficient promotion of equal opportunities** represents one of the obstacles to the increased competitiveness of the economy. **Insufficient promotion of equal opportunities for women and men** and failure to address fully the issue of inequality is one the key issues of contemporary society. In the area of social protection, special emphasis is given to the development of services. Key obstacles to the development of social and child welfare may be an insufficient number of licensed providers of social services. (2)
TECHNOLOGICAL FACTORS	Innovations as one of the main drivers of economic growth are gaining a rather important place in all types of economic activities of Montenegro and are being deemed as basis for economic transformation and modernization of the country. In order to achieve the desired results, Montenegro has recognized a need to create a well interconnected system of innovation by investing in human resources, their knowledge and skills, combined with developed infrastructure. The various databases of different public administrations are insufficiently connected so that mean that users need to seek and request services one by one. The registration of businesses is a streamlined and a relatively inexpensive procedure. On-line company registration and on-line filing for tax and social security returns are operational, and licensing procedures have been simplified. (2)

12.5 SWOT Analysis

The DHITECH preliminary work was finalized to identify the Strengths, Weaknesses, Opportunities, Threats related to Albanian and Montenegrin context, in order to highlight an improvement strategy. For this final goal it is used a strategic planning technique: the SWOT Analysis.

It is intended to specify the objectives of the business venture or project and identify the internal and external factors that are favourable and averse to achieve those objectives.

- Strengths: territorial characteristics can give an advantage over others.

- Weaknesses: territorial characteristics cause disadvantage compared to others.
- Opportunities: elements in the environment that the incubator could exploit to its advantage in the interested area.
- Threats: elements in the environment that could cause troubles for the incubator work.

In order to structure SWOT Analysis, DHITECH relies on all the aspects previously analysed, integrated with more information.

STRENGTHS	• Candidacy in EU; • Raw materials and good suppliers; • Product design and packaging; • Innovation and creativity; • Strategy, ownership, financial position; • Good location; • Prices, efficiency; • Good market and competitive position; • Good terms of sale; • Export orientation. (2)
WEAKNESSES	• Unfavourable legal and market environment; • Weak financial position; • Deficiency of quality staff and management; • Weak business strategy and business processes; • Deficient technology and equipment; • Improper marketing activities and skills; • Insufficient capacity of labour; • Poor infrastructure;

	• Network industries; • Corruption. (2)
OPPORTUNITIES	• Improve company strategy and business processes; • Invest in capacity, technology and equipment; • Get better business environment and infrastructure; • Orientation to better customer satisfaction; • Improve marketing and promotion. (2)
THREATS	• Global financial and economic crisis; • Labour market problems; • Low technological advancement; • Incapacity of internationalization and competition; • Low level of R&D and innovation • Inefficient institution; • Lack of government efficiency; • Inefficiency in tax paying; • Inefficiency in registration property. (2)

12.6 Incubator for Digitalization and ICT Development

All the studies have shown that in Montenegro there is a significant lack in ICT and digitalization development and initiatives especially in the northern part of the country. According to currently available data, situation on the coast side of the country (south region) is better than in northern part but is far from the development in the central part of country. Both regions (south and north) are geographically, ethnically and culturally connected with Albania. That is a very important for sustainable Ecosystem, transfer of knowledge, talents and joint actions.

Liveshow location and location of workshop are chosen taking in consideration these factors and preconditions for sustainable interregional Ecosystem.

The Montenegrin government, in cooperation with other states of the European Union, is encouraging the digital growth of the local economy, with the final aim to enter in the EU.

These initiatives include the adoption of electronic identity cards and unification of all identification documents, biometrical passports, the spread of the 4G network, introduction of 5G network, development of e-Government platform, program of electronic records in healthcare sector, electronic tax records and series of initiatives to encourage young people to develop innovative ideas.

Three Montenegrin strategies and one policy are very important for sustainable Ecosystem development: Strategy S3 (Smart Specialization Strategy), Strategy for of development of information society of Montenegro until 2020, Strategy for development of micro, small and medium sized enterprises in Montenegro by 2022 and Industrial policy of Montenegro by 2023.

In line with the strategies outlined above, the Montenegrin government wants to innovate and develop through ICT all the small and medium enterprises, through the following activities:

- **Complexity of business environment**:
    - Improvement of legal regulation;
    - Further simplification of administrative procedures and electronic accessibility to public service;
    - Predictability of legal and tax instruments.
- **Accessibility of finance:**
    - Easier and simplified access to different sources of financing;
    - Diversity of financial instruments according to the needs of MSMEs;
    - Improvement of insufficiently developed capacities of financial institutions and MSMEs for mutual development cooperation.
- **Education and human resources capacity:**
    - Acquiring the necessary knowledge and skills within formal education and non-formal learning according to the needs of MSMEs and the labour market;
    - Capacity building of business and advisory service providers.
- **Insufficient competitiveness of the company:**

- Ringed institutional infrastructure;
- Improvement of non-financial support to MNSP;
- Introduction and application of international standards in business;
- Connection of MSMEs with knowledge centers and innovation development;
- Connection of MSMEs into clusters and chains of suppliers;
- Willingness to export.
- Support in innovation for companies. (32)

Taking in consideration all these objectives, Montenegro need an Incubator that could give to enterprises the possibility to grow with specific learning paths inside the very specific segment in digital and technological field, making available new innovative devices and technologies, allowing with the digitalization of all services, and support local start-ups' development. This could align Montenegrin companies with the dynamics of European business, favour economic, technological and digital growth, and make companies more competitive in the global market.

Real expectations show that Digital Incubator in Montenegro can significantly contribute to faster and better implementation of current Strategies and create preconditions for companies to grow in the field of Information and Communication Technologies. The digitalization could also lead the public administration to save money and time substituting paper with digital services, and it could lead companies to interact easier with public administration, customers and financing sources. Creating the conditions for developing and maximizing the use of "computing in cloud "by both, business and public sector, too, should contribute to the growth of digital economy. The statement is based on the available statistics which confirm the multiple benefits of Cloud Computing. In 2011. Microsoft conducted a study that showed that switching to the cloud services brought as much as 40% more revenue for SMEs compared to those that did not switch to cloud untill 2012. The EU has shown that for over 80% of businesses surveyed, the move to cloud computing is down costs up to 20%. Also, mentiond study has shown that productivity is increasing up to 40%. (41)

It has also to remind the concept of **"Industry 4.0",** as representing the digitalization of manufacturing. In Montenegro ICT is evolving in context of development of information systems in public administrations, education, industry and health, all in line with current technological trends and the concept of Industry 4.0.

Montenegro's ICT infrastructure is at a satisfactory level and is ranked 39th in the world (Global Innovation Index.2018), with intensive use of software and ICT services. In Montenegro 98.5% of surveyed companies

(MONSTAT,2018.) use computers in their business, with about 40% of them employing ICT experts, representing an increase of 2.6% compared to 2016. year. When it comes to the internet, about 80% of businesses have its own website, up 3.6% from 2017. year. (42)

Industry 4.0 concept leads us to the fourth breakup in manufacturing – the creation of truly smart factories with cyber-physical systems and communication across the Internet of Things, in four main point:

- Digitalization and Connection of all actors in the Value Process;
- Fusion of the Production with ICT;
- Cyber-Physical Systems are intelligent, they connect industrial production and logistics units who can communicate together.

12.7 BUSINESS MODEL CANVAS

The **Business Model Canvas** is a simple framework that considers 4 main business areas: CUSTOMER, OFFER, INFRA TRUCTURE, FINANCIAL VARIABILITY, and these 4 areas are deeply analysed in 9 basic blocks that show the logic of how a company intends to make money.

Going through these 9 blocks we could understand how the Incubator could fit all the strategic objectives of Strategy for of development of information society of Montenegro until 2020, Strategy S3 (Smart Specialization Strategy), Strategy for development of micro, small and medium sized enterprises in Montenegro by 2022 and Industrial policy of Montenegro by 2023., in the fields of ICT, Digitalization and Industry 4.0. (21)

12.8 CUSTOMER SEGMENTS

Customers are the key element of the business model, according to it customs, preferences and needs business model is shaped and customized.

The company must be aware of all the features of its customers, including how they feel, how they think and act, what they expect from your company in order to be able to group customers into segments and shape services according to their characteristics and expectations. A business model can define one or more customer segments according to the common needs, behaviours, geographical dispersion, field of industry or other attributes.

For the Montenegrin incubator, according to DHITECH suggestions two main customers segments are identified:

Users: People that use services that the incubator offers	**Sponsor:** People and institutions that want to collaborate and to take part in the incubator's activities.
• Existing Enterprises (SMEs); • Start-ups and innovative ideas; • Students (graduated, not graduated, PhD students); • Institutions (private and public); • People interested in business and innovation. • Educational centres • NGOs	• Investors: → Banks; → Business Angels; → Venture Capital (Companies want to invest in new projects); → Public Administration; → Private institutions. → Big enterprises → Individuals (Diaspora Montenegrin) → Universities and Research Institutes

12.9 CUSTOMER RELATIONSHIP

Customer Relationships define the type of relationships that the company establishes with its customers. In marketing literature this relationship is emphasised as a determinant of success of the companies. Companies that can maintain good relationship with its customers have more possibilities to be successful. This form of communication helps the company to acquire new customers and retain existing ones. The purpose in this case will be both to get in touch with new customers and to consolidate relationships.

Even if is mentioned in Albanian evaluation of this segment that in this case the relationships are almost the same for users and sponsors, we cannot agree with that in total. We agree that are similar but if we look this from position of expectations of this type two types of the customers, we can notice that differences exist.

Users & Sponsor
• Social and Web Advertising; • Event Sponsoring (brochure, flyers, business card);

• Information Meetings (brochure, flyers, business card); • Membership Card; • Business networking activities; • Collaboration with Enterprises.

12.10 CHANNELS

The Channels block represents the set of means by which the value proposition reaches the customer, in communication, distribution and sales phases. Channels are used to inform the potential customers about the services offered by the incubator.

Mainly due to the growth of the Internet, the concept of multi-channel strategies has acquired increasing interest in the field of marketing. With the use of multi-channel strategies, organizations increase their potentiality by reaching customers in different ways. Mostly Incubator can really on direct sale channel and "word of mouth" marketing. Combination of direct and online sales channels is recommended as a best combination.

Users & Sponsor
• Social (Facebook, Instagram, Twitter, Banner); • Organized events and meetings in schools, companies, universities; • Organized events in the incubator office; • Participation in business events. • Own interactive web site thought which some of the services can be provided online

12.11 VALUE PROPOSITION

Value Proposition is the reason why customer segments turn to one company over another.

It solves a customer problem or meets customer needs. Each Value Proposition consists of a selected set of products and services that meet the requirements of a specific customer segment.

Some Value Propositions can be innovative and offer customers something revolutionary, a price reduction that leads to economic savings, or the improvement of a product's design and performance.

However, the customer is the real protagonist, with his well-being and the satisfaction of his functional, emotional and social needs.

The incubator offers different sets of services for users and sponsor, and it reserves special offers and prices for the incubator's certified members.

Users:	**Sponsor:**
• Learning path in technological and digital fields; • Learning path in entrepreneurship and innovation; • Learning path in business and management; • Learning path in data management; • Making available hardware and software. *In particular for Enterprises and start-ups:* • Meetings with investors and experts; • Rent of rooms and devices; • Usage of server room; • Benefits and special offers for members • Benefits from trainings and workshops • Project Management and Business Modelling *In particular, for students:* • Summer start-up school; • Business environment customs; • Entrepreneurial school.	• Meetings with start-ups and entrepreneurs; • Usage of room for conferences; • Source of talented young people; • Business opportunities through possibilities to invest in innovative ideas; • Business spreading introduction of innovative solutions; • Investment in new patents.

12.12 REVENUE STREAMS

If customers are the heart of a business model, the revenue streams are its arteries.

A company must wonder for what value each customer segment will really pay, and it has to generate one or more revenue streams from each customer segment.

The variables to be considered are prices (fixed or dynamic) and payment methods, fundamental aspects for making the business model sustainable.

Revenue flows can be generated by the sale of physical products, the payment of a fee for use, the sale of a license, brokerage fees and protected patent revenue.

In the following table, DHITECH tried to identify all the variables that will be the incubator's revenues (only from the users, because the investors will take part in our activities for free).

Users
• Training courses in technological and digital fields; • Training courses in entrepreneurship and innovation; • Training courses in business and management; • Training courses in data management, statistics and big data management. *In particular for Enterprises and start-ups:* • Participation fee for meetings with investors and experts; • Rent of rooms and devices; • Usage of server room; • Membership Card; • Server space fee; • Membership to international association fee; • Data access fee; • Project Management and Business Modelling.

In particular for students: • Participation fee for Summer start-up school; • Participation fee for Entrepreneurial school.

12.13 KEY ACTIVITIES

Key activities are required in order to create, capture and deliver value and to operate successfully. Key activities can be divided into productive, problem solving, maintenance or development. Key activities are the core of the Incubator and range of services are very important for determination of resources needed to deliver services on satisfactory level.

For both Users & Sponsor
• Organization and Management of: → Training courses in technological and digital fields; → Training courses in entrepreneurship and innovation; → Training courses in business and management; → Training courses in data management, statistics and big data management. → Summer start-up school; → Entrepreneurial school; → Events and meetings in schools, companies, universities; → Events in the incubator office; → Meeting events for investors and experts; → Meeting between sponsors and users; → Participation in business events;

→ Management of Social and Web Advertising; → Event Sponsoring (brochure, flayers, business card); → Supply of Membership Card and related services; → Purchase and Making available hardware and software; → Space maintaining; → Writing Business Model and Project.

12.14 KEY RESOURCES

Key resources are the set of resources a company must have to make its business work. They enable organizations to create, acquire and deliver value to targeted customers and make profits. They can be: human resources (workforce), physical resources (points of sale, plants, machinery), intellectuals (software, user licenses, copyright) and financial resources (loans, credit lines, cash).

Key resources and key activities are interconnected and must be uniquely integrated to provide value for targeted customers.

Human	**Physical**
• Director; • Project Managers; • Office Workers; • Server Specialists.	• Computers; • Office Furniture (desks, chairs, monitors, printers, digital whiteboard, etc.); • Hardware; • Projectors; • Specific innovative technique (3D printer, leasers) • Rooms.
Intellectual	**Financial**

• Software; • International associations access; • Data base access; • Software licences.	• Public Funding; • Credit lines.

12.15 KEY PARTENERSHIP

The Key Partners block represents the suppliers and partners with whom the company works to create value for customers. A company, in fact, is not a self-sufficient structure, but rather a system that acts within a broader context, supported by external actors.

Among our partner there are the investors, that are both sponsors and partners, they will take part in the incubator's activities, and the incubator itself will be also the meeting point between investors and innovative ideas that need money to start their business.

- Public Administration;
- Private Institutions (cooperative, associations etc..);
- Banks (OTP, NLB bank, Prva banka, Hipotekarna banka, …);
- Platforms for Crowdfunding;
- Business Angels;
- Venture Capitals;
- Research Institutes;
- NGOs;
- Public and Private Universities.

12.16 COST STRUCTURE

The Costs Structure block defines the most important costs sustained during operation in a business model.

The costs can be fixed or variable (staff, rent, goods purchases, energy utilities, advertising, etc.), they are computed after defining the key resources, key activities and key partnerships.

However, the central objective is to make sure that the revenue streams exceed the expenses: only in this way the project can be considered effectively sustainable.

- Rental fee;
- Devices (computer, projectors, monitors, printers, digital whiteboard, server etc…)
- Consumption fee (energy, water, light, drainage system, garbage);
- Salaries;
- Advertising;
- Marketing (participation at events and fairs);
- Events Organization with experts;
- Experts fees;
- Data base access fee;
- Membership in various association fees;
- Maintenance costs;
- Administrative costs (office furniture, software licences, fax, internet fee, membership costs);
- External services suppliers (lowers, accountants, consultants);
- Taxes.

12.17 Financial Plan Example

To make more concrete its suggestions, based on DHITECH hypotheses and example of Financial Plan for the Albanian Incubator, an example of financial plan for potential incubator in Montenegro is developed, taking in consideration Montenegrin conditions and actual analysis. The Montenegrin Incubator should offer its customers a wide range of service rather than a product. For this reason, its revenues will not come from the sales of assets, but asset will be used as a key resource for provision of services. For the implementation and establishment of Incubator access to the public financing is crucial. Relaying on this financial source, it should be useful to invest € 20,000 of social capital and initiate a loan from the bank for € 100,000. These sources

will allow it to sustain expanses for the first year. According to DHITECH suggestion repayment of the loan is projected in the following 4 years, with one year of grace period and with an interest rate of 6%.

From the second year, there is a state funding of € 200,000, divided into 4 tranches of €50,000.

The main costs are related to the purchase of the necessary equipment, such as computers, projectors and the server; this equipment will be the core of Incubator offer and base for creation of service offer. In fact, we sustain the highest costs in the first year, and at the end of it a passive closure is recorded.

The workplace will be in Podgorica, it is about 600 square meters and includes 2 rooms dedicated to start-ups and 2 rooms for companies, a conference room, a meeting room and an office. In these rooms, workstations will be set up to allow start uppers and companies to work on digitization and ICT.

Incubator's revenues come from different services that the incubator will offer, especially from the design of Project and Business Plan, trainings, event organization, accounting services. It is planned to start implementation of all activities in the second year, while the first year will be used for planning, preparation and promotion of Incubator services. It is estimated that up to 12 projects could be prepared in the first year and increase this value up to 25 projects in the fifth year of work.

Design

	YEAR II	YEAR III	YEAR IV	YEAR V
N. DESIGN				
-Writing	12	15	20	25
-Approval	4	5	8	10
Revenue Design				
-Writing (5%)	60.000 €	75.000 €	100.000 €	125.000 €
-Approval (6%)	24.000 €	30.000 €	48.000 €	60.000 €

To achieve projected numbers three highly qualified Project Managers will be hired to manage all activities.

Another important activity is the implementation of many annual courses and trainings of Entrepreneurship, Business and Management.

Among the planned activities there are:

- Start-up Summer Schools: 10 participants;
- Entrepreneurship annual schools: 15 participants;
- Software Usage Schools;
- Conferences (every 4months) with experts: 100 participants in total.

People and companies could also join the incubator, in this way they can take advantages and discounts. Membership program will have two loyalty programs. Users can become Member A and a Member B through the **Membership Card**, useful also to retain clients. Member A can have discount up to 30% on conferences and other Incubator service and it is convenient for middle size and big companies, also for different institutions and organizations. Membership program B will offer to users discounts up to 15%. The incubator does not exclude other benefits to be included over the years. This initiative can increase customer loyalty and strengthen a territorial network necessary for the development and growth of the country.

Below there is a clear description of all the costs/outlays and the revenues/incomes related to this Financial Example:

OUTLAYS/COSTS						
COSTS	**YEAR I**	**YEAR II**	**YEAR III**	**YEAR IV**	**YEAR V**	
Rental fee	30.000 €	30.000 €	30.000 €	30.000 €	30.000 €	
Consumption fee	2.000 €	2.000 €	2.000 €	2.000 €	2.000 €	
Devices:						
- Laptops	10.000 €	0 €	0 €	0 €	0 €	
- Projectors	2.500 €	0 €	0 €	0 €	0 €	
- Furniture	30.000 €	0 €	0 €	0 €	0 €	
- Server	50.000 €	0 €	0 €	0 €	0 €	

- Maintenance Costs	1.200 €	1.200 €	1.200 €	1.200 €	1.200 €	
Server Management	2.500 €	2.500 €	2.500 €	2.500 €	2.500 €	
Salaries	70.800 €	70.800 €	70.800 €	70.800 €	70.800 €	
Conferences for Membership A	0 €	500 €	1.200 €	1.800 €	2.500 €	
Conferences for Membership B	0 €	650 €	900 €	1.300 €	2.000 €	
Return Loan	0 €	25.000 €	25.000 €	25.000 €	25.000 €	
Advertising	0 €	1.500 €	1.500 €	1.500 €	1.500 €	
Marketing	0 €	4.500 €	4.000 €	3.500 €	3.500 €	
Events with experts	0 €	4.000 €	4.000 €	4.000 €	4.000 €	
License's Purchase	1.000 €	1.000 €	1.000 €	1.000 €	1.000 €	
External Consultants	2.500 €	2.500 €	2.500 €	2.500 €	2.500 €	
Interests	1.400 €	1.400 €	1.400 €	1.400 €	1.400 €	**TOTAL**
TOTAL COSTS	**203.900 €**	**147.550 €**	**148.000 €**	**148.500 €**	**149.900 €**	**797.850 €**

INCOMES/REVENUES						
REVENUES	**YEAR I**	**YEAR II**	**YEAR III**	**YEAR IV**	**YEAR V**	
Founding	100.000 €	0 €	0 €	0 €	0 €	
Public Founding	0 €	50.000 €	50.000 €	50.000 €	50.000 €	

Social Capital	20.000 €	0 €	0 €	0 €	0 €	
Design:						
- Writing	0 €	60.000 €	75.000 €	100.000 €	125.000 €	
- Approval	0 €	24.000 €	30.000 €	48.000 €	60.000 €	
Events:						
- Startupper Summer School	0 €	18.000 €	18.000 €	18.000 €	18.000 €	
- Entrepreneurial School	0 €	22.000 €	22.000 €	22.000 €	22.000 €	
- Software usage	0 €	11.000 €	11.000 €	11.000 €	11.000 €	
- Conferences	0 €	60.000 €	60.000 €	60.000 €	60.000 €	
Members:						
- Members type A	0 €	800 €	1.300 €	2.000 €	2.800 €	
- Members type B	0 €	700 €	1.200 €	1.800 €	2.500 €	
Rooms Rental Fee						
- Companies	0 €	0 €	0 €	0 €	0 €	
- Startups	0 €	0 €	0 €	0 €	0 €	**TOTAL**
total revenues	**120.000 €**	**246.500 €**	**268.500 €**	**312.800 €**	**351.300 €**	**2.299.100 €**

Then, there is a prospectus of the net income across the five years:

	YEAR I	YEAR II	YEAR III	YEAR IV	YEAR V
REVENUES - COSTS	-83.900 €	98.950 €	120.500 €	164.300 €	201.400 €
INCOME TAXES	0 €	20.779,5 €	25.305 €	34.503 €	42.294 €
NET INCOME	-83.900 €	78.170,5 €	95.195 €	129.797 €	159.106 €

Finally, there is a graph that represents total costs, total revenues and net income over the five years, in order to see where we reach the Break-even point: in the last months of 4th year.

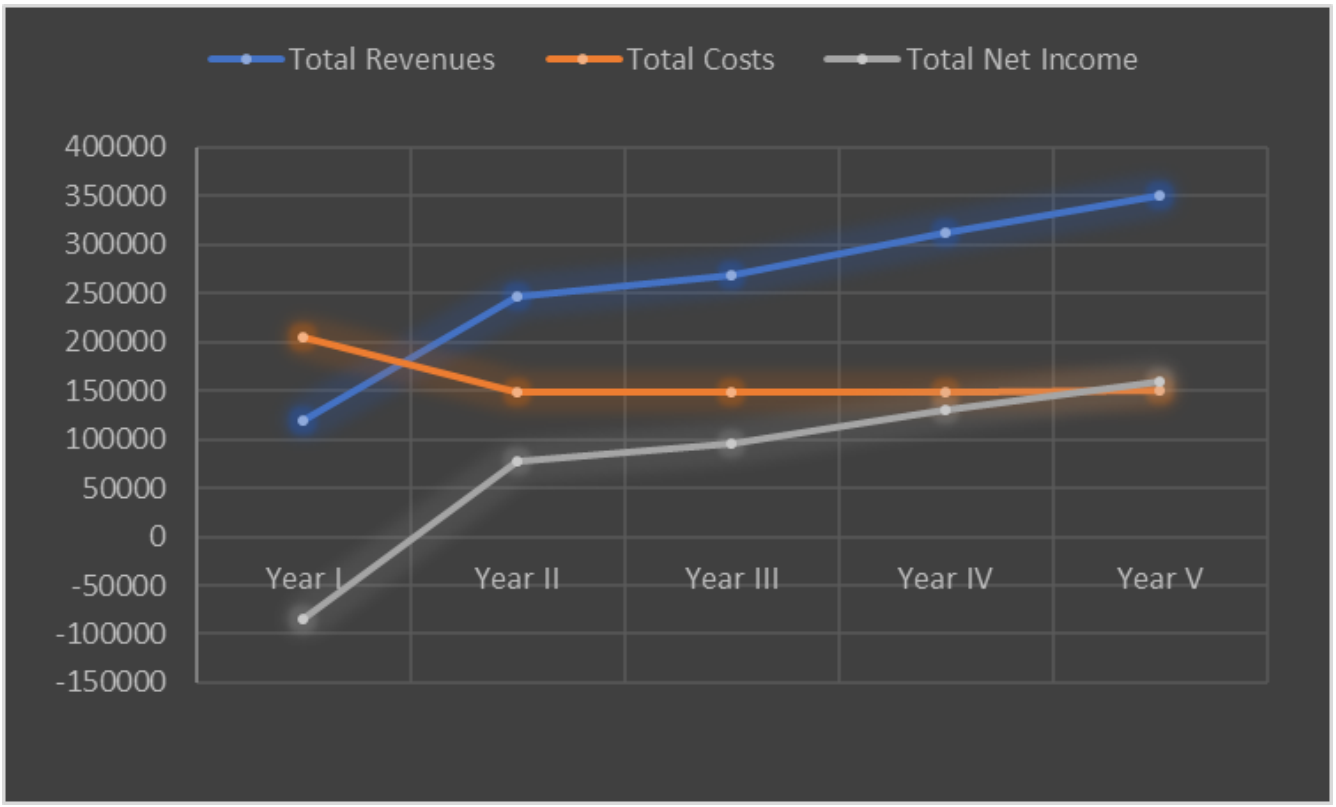

Figure 16 total costs, revenues and net income over five years

12.18 Follow-up

One possible development of the Incubator is the inclusion of new territories. After stabilizing revenues coming from Montenegro, the incubator could expand its reach towards countries with the same language area, like Serbia and Bosnia-Herzegovina offering more services, and considering the possibility to open a new locations in Montenegro, especially northern side.

Montenegrin Incubator could be linked with Albanian in order to create sustainable and competitive Ecosystem model, which will lead these incubators to leader position on the Balkans. Also, the connection with Albanian Incubator can help to Montenegrin team to gain experience in market penetration and internationalisation of this kind of business.

Montenegrin and Albanian incubators jointly can be very competitive for further internationalization especially on market of Serbia and Bosnia-Herzegovina. Albanian experience transferred to Montenegro and Montenegrin language, cultural and geographical closure to mentioned markets can create sustainable Ecosystem which can be successful example of interregional cooperation in this field.

12.19 Serbia and Bosnia and Herzegovina: Context Analysis

Serbia is a country situated at the crossroads of Central and Southeast Europe in the southern Pannonian Plain and the central Balkans. It borders Hungary to the north, Romania to the northeast, Bulgaria to the southeast, North Macedonia to the south, Croatia and Bosnia and Herzegovina to the west, and Montenegro to the southwest. (43) Serbia's economy is concentrated in the sectors of Agriculture and food industry, Construction, Trade, Transportation, Energy, Telecomunication, Tourism Mining, Industry (processing of steel, automobile industry, processing of copper and gold extraction), Handicrafts. Small and medium-sized enterprises (SME's) is a significant segment of the Serbian economy which make up 99.8% of the total active businesses, employing nearly 2/3 of employees in the non-financial sector and account for about 30% of GDP in the formation of Serbia. Crucial development problems of the Serbian economy are unemployment (unemployment rate 23.0%), the high level of constant growth of external debt (25.8 billion Euros) and public debt (20.1 billion Euros) and a low level of investment, especially FDI (2,4% of GDP). Also, the dynamics of the recovery of the EU countries has a direct impact on the international economic position of the country - no progress of the EBRD sectoral transition indicator (2.58), still unfavorable business environment and the least competitive European country. The unfavorable international situation of the national economy directly affects the positioning of SMEs in Serbia in relation to the number of SMEs of the EU and neighboring countries.(44)

Based on 2013 data from Serbia's statistical service, the SME sector consists of 280,845 enterprises, 96.1% of which belong in the micro segment with up to 9 persons employed. Small (10–49 employees) and medium (50–249 employees) enterprises total 8,903 and 2,011, respectively,and there are just 489 large enterprises with over 250 employees in the country. The most important economic sectors for SMEs are trade, at 30.2% of 2011 enterprises, and manufacturing, at 16.2% of enterprises. Enterprises involved in professional, scientific, innovation, and engineering activities, which include Serbia's growing information technology sector, also made up a notable 11.6% of SME.(45)

SMEs are somewhat concentrated in Northern Serbia, with the district surrounding the capitol city of Belgrade accounting for 31.0% of enterprises and the agriculture-rich Vojvodina region (7 districts) taking up another 22.3% as of 2011. The remaining 17 southern districts share the remaining 46.7% of the enterprises. (45)

Innovations in Serbia's technology sector exhibits a healthy degree of innovation, with several startups working in enterprise software, e-commerce, and technology hardware succeeding in obtaining investment in the region and in Western Europe and entering the revenue stage. A small number of local success stories, most notably that of the Facebook-based fantasy soccer platform Nordeus with its 11 million active users per month, have worked to encourage technological entrepreneurship and build the country's startup community. Technological innovations developed through Novi Sad University, including several health and agriculture related technology hardware projects, have had some success with commercialization, and software development outsourcing companies have also had success in Serbia. Innovation can also be observed in agricultural development with enterprises beginning to adopt technology such as anti-hail nets and drip irrigation systems in order to boost production. Organic agriculture is also emerging as a trend in Serbia. (45)

The biggest identified obstacles for SME's in Serbia are: corruption, inaduqately educated workforce, access to finance, informal economy and inadequate activities of institutions.

Having in mind context analisy of Serbia we noticed that although this is a country that is territorially larger than Montenegro, the problems in the development of small and medium-sized enterprises are pretty much the same. For the internationalization of Incubators especiallty it is important that there are a growing number of ICT startups in Serbia which gives management the opportunity to expand the business in Serbia with the acquired knowledge and experience.

The situation in Bosnia and Herzegovina is quite similar to Serbian and Montenegrian. According to Bosnia and Herzegovina assessment of financing needs of SMEs in the Western Balkans countries report among the 32,760 active enterprises that submitted relevant data, 32,441 (or 99.0%) were MSMEs with 0–249 employees. SMEs accounted for 66% of employment, 72% of turnover, and 62% of value added in 2014, according to the Structural Business Statistics report of the Agency for Statistics. According to official statistics, which apply the EU NACE categories of business activities, enterprises engaged in trade account for 30.5% of the total number of enterprises; manufacturing, 13.5%; construction, 6.1%; and agriculture, 2.4%. After including the small share of enterprises in mining and electricity generation (1.2% of the total), the remaining 46.2% can be attributed to the services sector. (46)

Talking about regional dispersion situation in Bosnia and Herzegovina shows that 65.0% of all active legal entities are registered in the Federation, 31.1% in Republika Srpska, and 3.9% in Brcko District. There is a reasonably good distribution of business activity throughout the country. Although the entity-level capitals of Sarajevo and Banja Luka are the main centers, they donot dominate business activity by as large a margin as the capitals of some other countries in the region. This distribution of business activity is consistent with the population, which is spread across a large number of urban centers in various parts of the country. Other main cities include Tuzla, Zenica, Bijelina, Mostar, Prijedor, and Brcko. (46)

All the above data indicate that there is a realistic basis for the internationalization of incubator business in the markets of Serbia and Bosnia and Herzegovina. It is also encouraging that the governments of both countries are counting on small and medium-sized enterprises as major drivers of the economy and are planning significant investments in this sector.

SECTION 4: Interregional Ecosystem Model

13 Medium and Long term Ecosystem Evolution

The Interregional Ecosystem, which starts from this project, will have a hypothetical evolution in the medium and long term. First of all, thanks to example and the support of the Dhitech, the Albanian Partners will be able to give light to their technological district, based on the current context needs and trends. This district, through the collaboration with the Italian one, will progressively grow after the end of this project, starting from the Balkan area. In the first period, the Montenegrin partners and territory will refer to the Albanian district, in order to gain expertise and strength and, when they feel ready, establish their own district in Montenegro. Therefore, the ecosystem set up during this project, will evolve and expand in the medium and long term, under the guidelines of the Dhitech model, in order to be scalable and replicable in other European areas. It will be progressively enriched by other stakeholders and strengthened by the interregional collaboration.

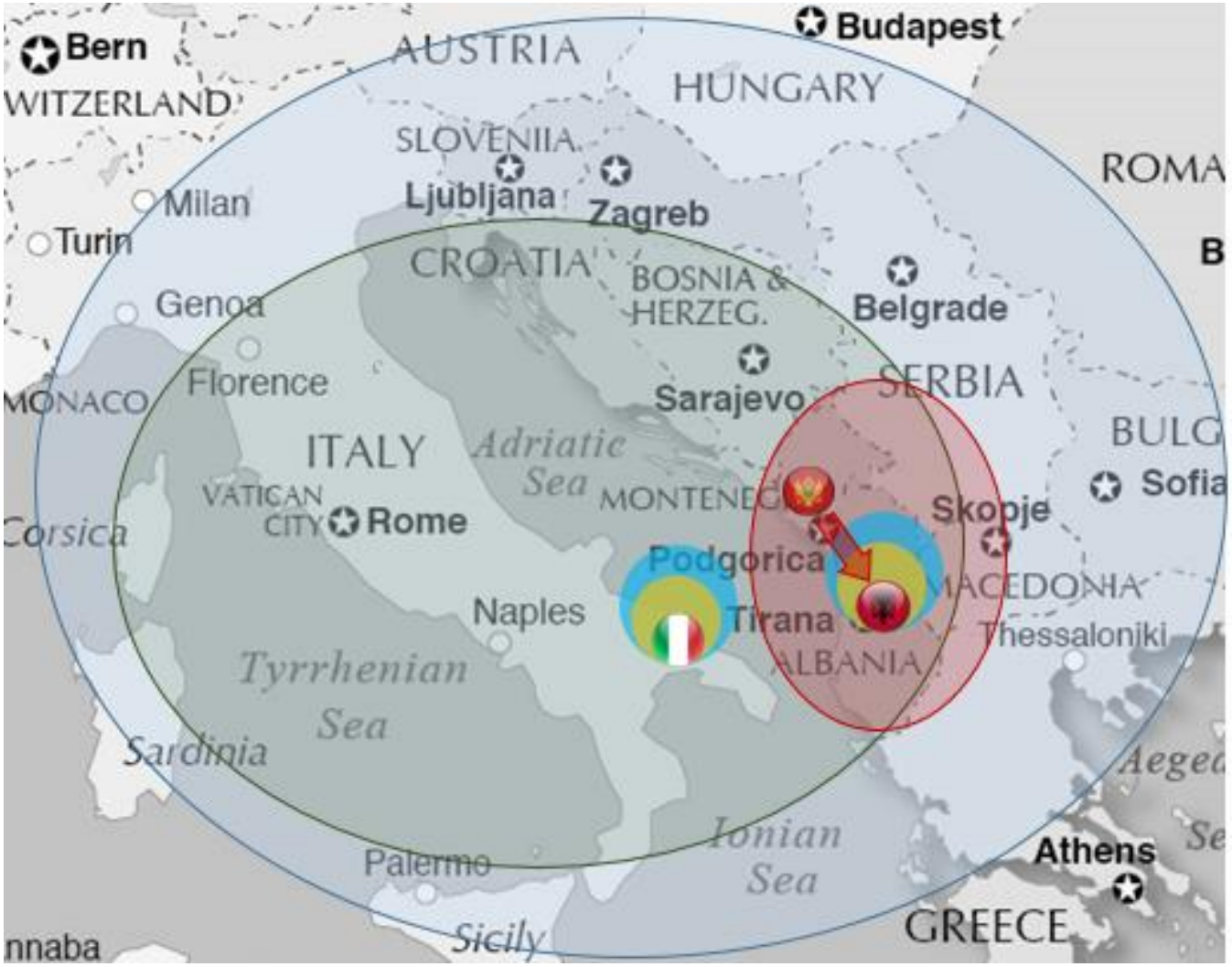

Figure 16 Interregional Ecosystem in the medium term

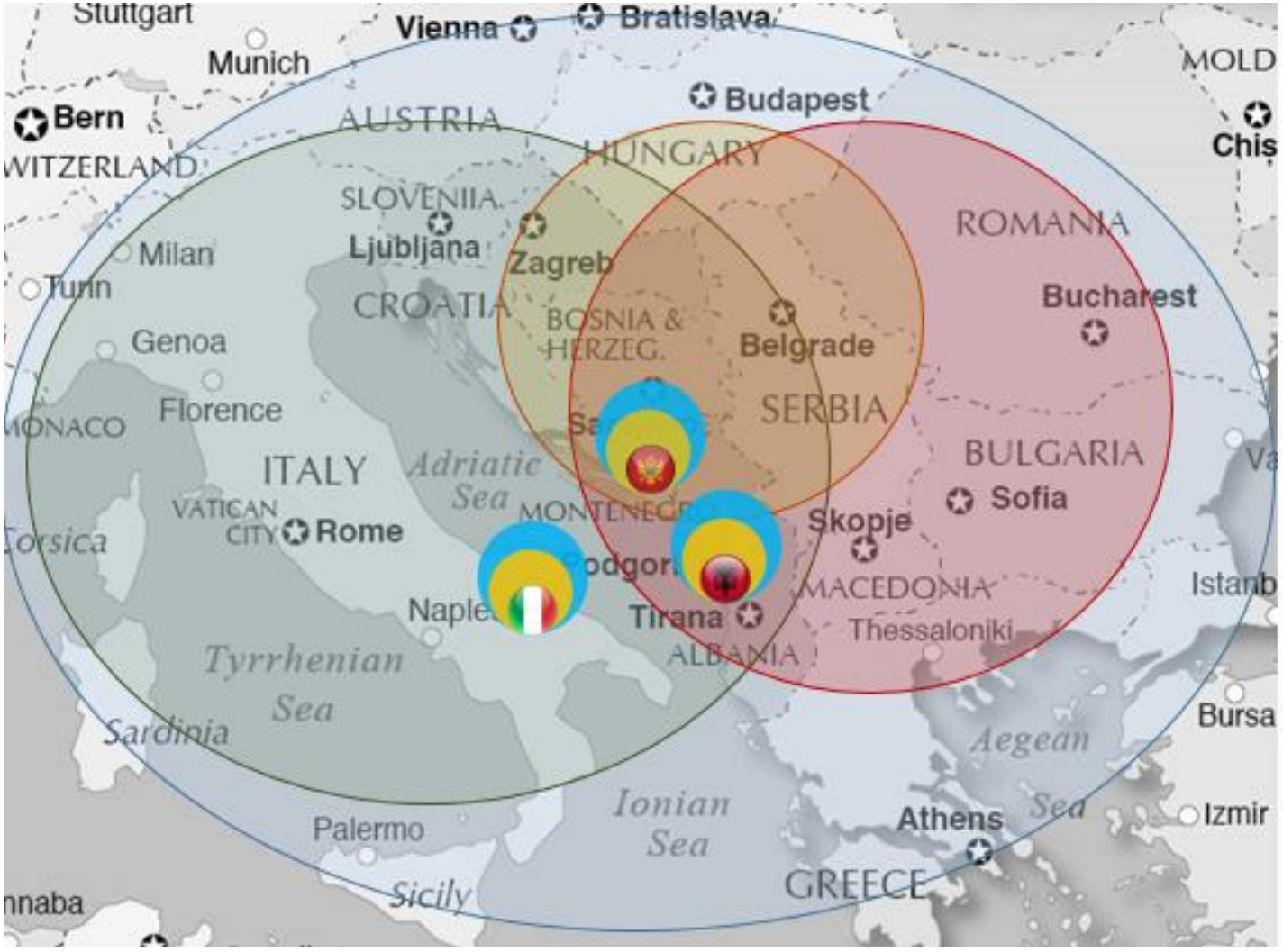

Figure 27 Interregional Ecosystem in the long term

15 Bibliography

1. ECONOMIC REFORM PROGRAMME OF ALBANIA (2019-2021). Secretary-General of the European Commission, signed by Mr Jordi AYET PUIGARNAU, Director. Brussels : s.n., 2019.

2. Deliverable_T1.1.2

3. The Albanian Economy in Transition: The Role of Remittances and Pyramid Investment Schemes. P.Korovilas, James.

4. Deliverable_T1.1.1

5. INSTAT (2019). [Online] http://www.instat.gov.al/.

6. Ministry of economic development, Trade and Entrepreneurship (2014), Business And Investment Development Strategy for The Period 2014-2020.

7. Building an Information System to Enhance Innovative SMEs in Albania. Rembeci, Godiva. s.l. : European Journal of Economics and Business Studies, (2017), Vol. 3.

8. danube-inco. [Online] https://danube-inco.net/object/document/10671/attach/InnovationInfrastructuresinWBC_see-science_euReport_version1_3.pdf.

9. VSP Onlus. [Online] https://www.vsponlus.org/portfolio/albania-incubatore-di-business/.

10. Metropolitan Incubator. [Online] http://en.umt.edu.al/index.php/research/metropolitan-incubator.

11. AppKubator. [Online] p://www.startup.appkubator.com/.

12. Protik. [Online] https://it.linkedin.com/company/protik-innovation-center.

13. Garazh. [Online] https://invest-in-albania.org/garazh-the-newest-it-community-in-tirana/.

14. AADF. [Online] https://www.aadf.org/education-leadership/.

15. HUB, Innovation. [Online] http://incubator.al/about-us/.

16. Ministry of Internal Affairs and Albanian State Police (2018). [Online] https://mb.gov.al/.

17. Doing Business and Investing in Albania. [Online] www.pwc.com/al.

18. Italian-Albanian Program for the Growth of SMEs in Albania. Albania, ItalCoop. 2019.

19. Toscani, Incubaori. [Online] http://www.incubatoritoscani.it/?page_id=99.

20. Incubators: Tool for Entrepreneurship. Aernoudt, Rudy. Belgium : s.n., 2002.

21. Cross-Cutting Strategy "Digital Agenda of Albania 2015-2020". Administration, Ministry of Innovation and Public. Republic of Albania : s.n.

22. Confindustria Lecce. [Online] http://www.confindustrialecce.it/.

23. VSP Onlus. [Online] https://www.vsponlus.org/portfolio/albania-incubatore-di-business/.

24. danube-inco. [Online] https://danube-inco.net/object/document/10671/attach/InnovationInfrastructuresinWBC_see-science_euReport_version1_3.pdf.

25. MONSTAT (2011). [Online] https://www.monstat.org/cg/page.php?id=322&pageid=322

26. ECONOMIC REFORM PROGRAMME FOR MONTENEGRO 2018 – 2020 (2018). [Online] https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/montenegro_erp_2018-2020.pdf

27. MONSTAT (2019). [Online] https://www.monstat.org/cg/page.php?id=1317&pageid=24

28. Trending economics Montnegro (2019). [Online] https://tradingeconomics.com/montenegro/wages

29.Doing business Report Montnegro (2019). https://www.doingbusiness.org/content/dam/doingBusiness/country/m/montenegro/MNE.pdf

30. ITU ICT development Index (2017). [Online] https://www.itu.int/net4/ITU-D/idi/2017/index.html

31. IMF Executive Board Concludes 2019 Article IV Consultation with Montenegro (2019). [Online] https://www.imf.org/en/News/Articles/2019/09/09/pr19329-montenegro-imf-executive-board-concludes-2019-article-iv-consultation

32. Strategy for the development of micro, small and medium-sized enterprises in Montenegro 2018-2022 (2018) [Online] www.gov.me

33. Strategy for the development of micro, small and medium-sized enterprises base for improvement in this sector (2018). [Online] http://www.gov.me/pretraga/190132/Strategija-razvoja-mikro-malih-i-srednjih-preduzeca-osnov-za-unapredenje-podrske-ovom-sektoru.html

34. World Economic Forum Montenegro Global Competitive Index (2017). [Online] http://www3.weforum.org/docs/GCR2017-2018/03CountryProfiles/Standalone2-pagerprofiles/WEF_GCI_2017_2018_Profile_Montenegro.pdf

35.Tehnopolis official web site, http://www.tehnopolis.me/online/en/services/

36. Official BSC BAR web site, https://www.bscbar.org/en/category/about-us-7/mission-and-goals-55

37. Official RBC web site, http://www.rbcberane.me/o-nama/

38. Official digitalizuj.me web site https://digitalizuj.me/onama/

39. Official web site of spark.me conference https://spark.me/about/

40.Official web site of M:tel Digital Factory http://digitalnafabrika.mtel.me/startup-akademija/

41. Strategy of information society development in Montenegro until 2020. [Online] www.cirt.me

42. S3 Strategy (Smart Specialization Strategy) [Online] http://www.mna.gov.me/ministarstvo/Strategija_pametne_specijalizacije/

43.Serbia Wikipedia, [Online] https://en.wikipedia.org/wiki/Serbia

44.Dasic D., Jelicic G., Buzurovic D., (2016), Analysis of entrepreneurs and small and medium enterprises in Serbia, Universitatia Simpro, [Online]

https://www.researchgate.net/publication/26718555_Serbia_within_the_European_context_An_analysis_of_premature_mortality

45. European Investment Bank, Serbia Assessment of financing needs of SMEs in the Western Balkans countries. 2016 [Online] https://www.eib.org/attachments/efs/assessment_of_financing_needs_of_smes_serbia_en.pdf

46. European Investment Bank, Bosnia and Herzegovina Assessment of financing needs of SMEs in the Western Balkans countries. 2016 [Online] https://www.eib.org/en/publications/econ-assessment-of-financing-needs-of-smes-in-bosnia-herzegovina

47. Innovation Hub Tirana official website https://www.facebook.com/innovationhubtirana/; http://www.innovationhub.al/

48. Smart Specialisation Platform - Digital Innovation Hubs https://s3platform.jrc.ec.europa.eu/digital-innovation-hubs-tool/-/dih/1398/view

49. Italian-Albanian Development Cooperation Programme includes a new instrument of financing innovative for Albania: the Debt for Development Swap Agreement (IADSA) on Innovation Hub Tirana http://iadsa.info/en/rezultatet/246/innovation-hub

51. Entrepreneurial Ecosystem in Albania with Focus on Tirana (April 2019) pg.21 http://challengefund.euforinnovation.al/file/2019/07/Gap-Analysis_E-Publication.pdf

52. Barleti Hub - Business Incubator-Accelerator http://barletihub.umb.edu.al/business-incubator-accelerator

This project is co-financed by the European Union under the instrument for Pre-Accession Assistance (IPA II)

This document has been produced with the financial assistance of the Interreg IPA CBC Italy-Albania-Montenegro Programme. The contents of this document are the sole responsibility of Confindustria Lecce and can under no circumstances be regarded as reflecting the position of the European Union and of the Interreg IPA CBC Italy-Albania-Montenegro Programme Authorities.